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World Bank Financed Dam Draining Lake Victoria

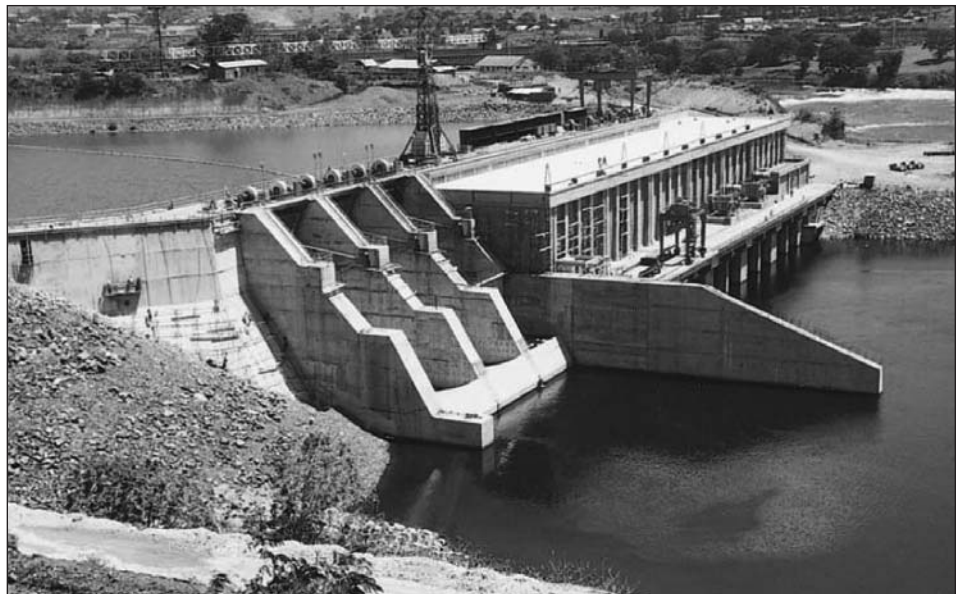
by Lori Pottinger

A new report by a Kenya-based independent hydrologic engineer confirms that over-releases from two hydropower dams on the Nile in Uganda are a primary cause of severe drops in Lake Victoria in recent years. The report finds that about 55% of the lake's recent drop is due to the Owen Falls dams (now known as Nalubaale and Kiira dams) releasing excessive amounts of water from the huge lake. Lake Victoria's natural control at Ripon Falls was removed for construction of the first dam in the 1950s. The second dam was built with World Bank funding in the 1990s.

The lake, which has dropped 1.2 meters since 2003, is now at its lowest level since 1951. Nearly 3% of the lake's total volume has been lost in the past three years. The receding shoreline has affected water supply systems, boat operators, fisheries and farmers. An estimated 30 million people depend on the lake for their livelihoods. *The Monitor* (Uganda) reported on February 27, "The low water level of the lake is sending shocks in the socio-economic and political spine in the region."

The new report, *Connections Between Recent Water Level Drops in Lake Victoria, Dam Operations and Drought* by Daniel Kull, analyzed recent reports produced for the Government of Uganda and other publicly available information. Reflecting a growing consensus of scientists in the region, the report concludes that the dams are greatly impacting the lake by releasing more water than is allowed by a legal agreement between Uganda and Egypt. This "Agreed Curve" is intended to ensure that the releases through the dams correspond to the natural flow of the river before damming.

The government of Uganda has denied the charges, but it appears that neighboring Kenya and Tanzania intend to look into the matter. In a February 13 article on the dams' effect on the lake, the *East African Standard* reported: "The secretary-general of the East African Community, Amanywa Meshiga, said delegates would meet next month in Tanza-



Kiira Dam is letting more water out of Lake Victoria than is being replenished naturally.

nia to discuss the situation and try to come up with solutions to reverse the trend."

Frank Muramuzi, of the Ugandan group National Association of Professional Environmentalists, said: "This dam complex is now pulling the plug on Lake Victoria, with implications for millions."

While this is the first time the connection between the dams and lake levels has gotten wide international media attention, it is not the first time the issue has been raised. Over a year ago, Hilary Onek, a Ugandan member of parliament and hydrologist, raised the issue of the dams releasing more water than the lake can sustain. In a March 2005 opinion piece in the Ugandan newspaper *New Vision*, he stated: "[Dam operator] UEGCL is currently releasing above 1400m³/sec to generate 220 MW of energy ... Thus they are releasing more water than is physically sustainable. To politicise electricity issues will only sink Uganda economically and socially."

Possible climate change must be a major consideration in the development of more

dams on the Nile. As the Kull report states, "It is unknown if Lake Victoria will recharge to the high levels and outflow experienced during 1961-2000, and if such a recharge could occur, whether it would be in the next years or only in 100 years. Viable non-hydro, or at least hydro not on the Victoria Nile, power generating alternatives must therefore be considered for Uganda." Until the recent addition of emergency fossil-fuel plants, Uganda has been almost entirely dependent upon hydropower for its electricity needs.

The World Bank's Role

The World Bank provided funding for the second dam and repair of the original dam. The project did not undergo an environmental impact assessment; indeed, the World Bank's 1991 appraisal report for the project stated: "Extension of the existing plant at Owen Falls will have minimal environmental impact because the project will not affect downstream hydrology or fisheries."

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Spreading the Water Wealth

As we went to press, thousands of politicians, water bureaucrats, corporate lobbyists and NGO activists were converging on Mexico City for the fourth World Water Forum. This jamboree aims to tackle perhaps the world's most pressing problem: how to ensure every person has access to enough clean water to live a decent life while ensuring sufficient supplies to water crops and maintain freshwater ecosystems.

The grim statistics of water – more than a billion people without access to decent drinking water, more than two million children dead each year due to dirty water and poor sanitation, hundreds of millions of farming families on arid lands suffering hunger, and freshwater ecosystems increasingly being sucked dry – point to the need for a revolution in the way we manage water.

The good news is that it is technically possible, affordable and achievable to provide water for all those who need it in coming years. The bad news is that the big-dam lobby is coming to Mexico City to press for an aggressive resurgence of investment in water mega-projects.

Big dams and water diversion schemes help development banks make big loans. They provide prestige projects for politicians and water ministry bureaucrats, and can make big profits for engineering and construction firms. But they cannot make a substantial contribution to meeting the basic water, food and energy needs of the world's poorest people.

The great majority of those living in extreme poverty are small farmers dependent on increasingly unreliable rains. These farmers also make up most of those without access to decent water and sanitation. Expensive big dam projects can provide water to cities, and to commercial farmers in the relatively limited plains areas close to major rivers and suitable for large-scale irrigation. But there is no way that they can provide water to the bulk of farming families who live on marginal lands and could not possibly afford water channelled, pumped and piped from distant reservoirs.

Pro-poor (and pro-nature) water management strategies include rainwater harvesting tanks and embankments, affordable drip irrigation and pump technologies, and farming techniques that reduce water needs while increasing yields.

Reaching the UN Millennium Development Goals by bringing 100 million small farming families out of extreme poverty through affordable water technologies would cost approximately \$20 billion over ten years – less than a tenth of developing countries' investment on large dams in the 1990s. The Sri Lanka-based International Water Management Institute estimates the economic benefit of lifting these farmers out of poverty as \$300-600 billion.

In arid Rajasthan in northwestern India, rainwater-harvesting embankments and small dams can supply drinking water to people at one-hundredth the cost of water from the notorious Sardar Sarovar Dam on the Narmada River. Sardar Sarovar will provide irrigation at a cost of around \$3,800 per hectare; human-powered treadle pumps can irrigate a hectare at a cost of \$120.

Just as the great majority of people without access to water live in rural areas of developing countries, so, too, do most of the 1.6 billion without access to electricity. The energy needs of poor rural areas are most likely to be met by improved cook stoves, mini and micro hydro projects, and other small renewable energy sources such as wind-powered pumps for lifting groundwater. Massive hydropower projects that power transmission lines headed to mines, industries and big cities rarely provide benefits to rural people.

Improving access to water and energy in rural communities across the developing world would free women and children from the drudgery of many hours spent every day carrying water and gathering fuelwood. It would dramatically improve people's health (especially if coupled with low-cost sanitation schemes). And it would reduce hunger and increase incomes, not just because of greater yields, but also because of the greater availability of energy for crop processing. Furthermore, small-scale technologies are just as viable for meeting the water and energy needs of the sprawling slums of the developing world.

Intelligent water and energy infrastructure development alone cannot solve the scandal of global poverty and inequality. Many other policy and institutional changes are also needed. But without a radical realignment of priorities in the water and energy sectors, the hope of water and energy for all will remain a distant dream.

Patrick McCully

IRN has just published a new report, "Spreading the Water Wealth: Making Water Infrastructure Work for the Poor," which goes into greater detail on this topic. The report is available at www.irn.org. IRN members will receive a hard copy by mail instead of the February issue of WRR.

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WCD+5: Assessing the “New Order for Rivers and Society”

by Ann Kathrin Schneider

The World Commission on Dams' recommendations have been constantly gaining acceptance in the five years since the WCD released its final report. This positive trend was impressively documented at an international conference to mark the fifth anniversary of the WCD report in November 2005 in Berlin, Germany. The conference was organized by International Rivers Network and the Heinrich Boell Foundation.

More than 80 decision-makers, activists, media representatives, development experts and others gathered to discuss progress in the large dams debate in the last five years, and to identify future action.

The goal of the conference was to assess the validity and importance of the WCD report and its recommendations five years on. In addition, the organizers wanted to provide an opportunity and a space for practitioners, experts and decision-makers to discuss how to overcome the challenges of implementing the WCD recommendations.

The presentations and debates at the conference moved between high hopes for fast progress in the near future and the acknowledgment of considerable challenges ahead. Representatives of private banks and the European Commission reminded the audience of the fact that the WCD recommendations have been adopted by major players. Participants stressed that the WCD framework had become the de-facto international standard for dams, independent of its formal approval.

It was recognized that today, the challenges and opportunities lie as much with policy adoption as with on-the-ground implementation. Deborah Moore, former WCD Commissioner, stressed the advances made and the difficulties ahead for implementation of the recommendations. “Communities and grassroots organizations around the world are using the WCD report as a tool to change their own situations. On the other hand, the lack of on-the-ground implementation of new non-dam approaches recommended by the WCD in specific projects is disappointing.”

Joji Carino, another former Commissioner and a member of the International Alliance of Indigenous Peoples, told those gathered in Berlin that the WCD recommendations had strengthened global networks of communities affected by dams and gave weight to their call for a strong civil society role in dam-related decision-making processes. “The international network of peoples

and communities affected by dams and their allies, formed in 1997 in Curitiba, Brazil, was enormously strengthened by their participation in the WCD process and by ongoing local and national campaigns,” she said.

Carino reminded the audience that progress on the ground for social and environmental justice in water and energy resource development needed to go hand in hand with progress at the policy front. She mentioned the importance of the WCD's support for essential policy principles such as free, prior and informed consent for indigenous peoples, and recognition of sharing benefits with directly affected communities. She said that the recognition of those principles by the WCD had greatly increased acceptance of those principles worldwide. Carino stressed that five years after the publication of the report, free prior and informed consent was a feature of national legislation in the Philippines, Australia, India, Colombia, Venezuela and Canada, and had been promulgated by a number of UN bodies.

Institutional Acceptance

Besides the wide adoption of certain policy principles set forth by the WCD, there are a growing number of institutions that have adopted the entire WCD decision-making framework. HSBC, one of the largest private financial institutions, has adopted the WCD recommendations in its new freshwater infrastructure sector guideline. This guideline spells out that the bank will “not provide facilities and other forms of financial assistance [...] to dams that do not conform to the WCD framework.” In Berlin, Ivor Godfrey-Davis from HSBC stressed that, for the bank, “the adoption of the WCD decision-making framework was not perceived to be a barrier to business, but rather an opportunity to seek out sustainable and profitable transactions.”

Frank Muramuzi, the executive director of the National Association of Professional Environmentalists in Uganda, reported on growing interest in the WCD in his country. He explained that in Uganda, the World Commission on Dams had inspired a national dialogue process on dams and development. Muramuzi said that the collaboration of government, civil society and the private sector in this national dialogue on dams was a remarkable achievement for the country, which has had divisive discussions over dams in the recent past. He added that the quality of the process and the mutual respect displayed thus far in the dialogue gave him



Frank Muramuzi and Deborah Moore in Berlin.

great hope for the process to result in the collective identification of the best solutions for the development of the country.

Conference participants applauded these developments inspired by the WCD. However, some participants were disappointed about the lack of fully WCD-compatible projects. To this date, such a project does not exist.

Professor Kader Asmal, former chair of the WCD, explained in written remarks for the fifth anniversary of the report: “I believe that the WCD report offers a cookbook of sorts for how to make the right infrastructure choices to meet people's needs. I say cookbook, because a good cook adapts the recipe to suit her or his tastes, to match the ingredients she or he may have available, to tweak the methods to fit his or her own cultural or culinary preferences. I have said time and again that the WCD report is not a ‘cookie cutter’ approach that can simply be implanted into national legislation.”

Conference participants recognized that it will take more effort to motivate institutions to commit to the spirit of the WCD framework and to help them find practical ways of implementing the recommendations. The goal is not to push for the absolute adherence to all recommendations included in the report. The discussions and presentations at the conference suggested that the next step is to encourage project developers, financiers and governments to comply with the spirit and basic conditions of the WCD framework.

In the spirit of the Chinese proverb: “Those who say it can't be done should not stop those who are already doing it.” The participants of the conference committed to utilize the report to continue fighting for the interests of project-affected communities and the environment, and to put more effort into promoting water and energy development options that effectively reduce poverty. ■

Damming the Data Flow

by Terri Hathaway

IRN's Terri Hathaway has spent the past six months traveling across Africa to work with local groups on dam and river issues. Here she describes the acrobatics she and local NGOs in Cameroon went through while trying to access the environmental studies for the proposed Lom Pangar Dam.

The information generated when planning a dam is overwhelming. If it's difficult for the public to follow a project when information is available, it's downright impossible when there's a bottleneck to the information in demand. In Cameroon, as in many other African countries, access to project information is often set up like an obstacle course, and trying to change the culture of secrecy and formality is an uphill battle.

An Environmental Impact Assessment (EIA) is often the first publicly released document with detailed information about a large dam. If, as is often the case, it is the only document to be publicly released, it provides the only opportunity for a public response and to ensure that the public interest is protected. An EIA may follow local regulations, or may be held to higher international standards as required by project funders. The EIA is likely written by outside consultants and will include both the impacts expected because of the project, as well as an action plan to mitigate these impacts. An EIA may be vague or it may be thorough; its existence alone does not guarantee a high level of quality or detail. This is another reason that public input is so critical.

Background on Lom Pangar Dam

In his New Year's Day public address, Cameroon President Paul Biya clearly expressed the national priority status of the Lom Pangar Dam, and the consequent expansion of the country's aluminum sector. But NGOs had already spent months fighting just for the public release of the dam's 24-volume EIA.

The Lom Pangar Dam is expected to have many serious impacts. The dam's reservoir will flood a protected forest area. The reservoir will also flood farmland and pathways used by herders, which will place greater pressures on other area resources. Malaria will increase in the reservoir area.

The EIA was initially scheduled to be released in May 2005, then, for the next six months or so, always "next month." Local groups were anxious to receive the document, and skeptical about government's pace in releasing the EIA once it was ready.

A Chronology of Frustration

Global Village Cameroon (GVC), a local NGO following the Lom Pangar Dam, and I tried to track down the project EIA over many weeks. It was unduly complicated by the fact that the government commonly insists that an audience for civil society concerns will only be made if the request is made in person. Here are the highlights:

October 12: ARSEL, the government agency in charge of the EIA, told us during an NGO meeting that there would be a workshop in nine days' time to hand over the EIA to the Ministry of Energy. Although French consultants had been working on the report for two years, little information about it had been released. Believing that the EIA would be the final version adopted by government, we were unhappy with the situation. GVC demanded that a draft be released prior to the workshop so that the public could start to read it before the meeting, and thus be able to formulate critical questions for the workshop. ARSEL assured us that the EIA would be available immediately after the workshop, either that afternoon or the next day. Since the workshop was being held on a Friday, we reasoned that maybe Monday would be the best day to try to get a copy.

October 13: A letter, signed by five local NGOs and two international NGOs, is sent to the Minister of Energy, requesting the draft EIA and a clear timeline for public comment prior to the "workshop" scheduled for October 21. There is no reply.

October 21: The ceremonial "workshop" took place at the Hilton Hotel in the capital of Cameroon. The event began over an hour late – a not uncommon situation here. Many government officials attended and listened to the



Global Village Cameroon staff members were diligent in their efforts to get a dam project environmental study into the public realm.

Photo: Terri Hathaway

presentation by the French consultants hired to write the EIA. When the presentations were over, only 20 minutes were allotted for questions from the public. The facilitator refused to call on the prominent head of a local NGO.

ARSEL distributed visually tantalizing (though informationally anemic) pamphlets about the EIA. The back of the pamphlet identified 16 NGOs, including GVC and IRN, as "critical of the EIA." However, none of the 16 NGOs had yet seen the EIA. Worse still, 10 of the 16 groups, all from outside Cameroon and as far away as Vietnam, had not even heard of the Lom Pangar project.

October 24: Monday morning after the workshop, three of us piled into a taxi and traveled 20 minutes across town to the ARSEL office to obtain the promised copies of the EIA. "Electronic copies of the EIA are ready for you on CD," an official assured us – but "they are locked in an office." Unfortunately, he said, the person we needed to see was not there. A phone call may have saved us the trouble, but informal phone calls between government offices and NGOs are not encouraged. However, this time, with two international NGOs in the room, we were given the man's mobile number and instructed to call in the afternoon, or to come back the next day.

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Flying Blind: Consultants Ignore Sudan Dam's Environmental Flaws

by Peter Bosshard

Five years after the World Commission on Dams documented the negative environmental impacts of large dams, international contractors are still building major hydropower projects without properly assessing environmental impacts. A new report reveals the serious environmental impacts of a large dam in Sudan, and the inadequate analysis of these impacts by the project managers.

The Merowe Dam on the Nile is the largest hydropower project that is currently under construction in Africa. Once it is completed in 2008/09, the dam's reservoir will be 200 kilometers long, and have the capacity to produce 1,250 megawatts of power. The project will displace 50,000 people from the fertile Nile valley to arid desert locations.

The Merowe Dam is being built by Chinese and Sudanese companies, and is a prominent example for the expanding role of China's dam builders around the world. Large Western contractors are also involved in the project. Lahmeyer International, a German engineering company, is managing project construction. Alstom from France is

supplying the electro-mechanical equipment of the power plant. Swedish-Swiss ABB is building the transmission lines.

The Merowe Dam will seriously impact the ecosystem of the Nile valley and affect all of Northern Sudan, yet it is being built without a full environmental impact assessment. Lahmeyer International only summarized some likely impacts in a brief report. According to Sudanese law, the Environment Ministry needs to review all environmental assessments of major development projects. Yet the dam authority never shared the Merowe assessment with the Environment Ministry.

In February 2005, International Rivers Network received a copy of the environmental assessment prepared by Lahmeyer International. IRN shared the document with the Environment Ministry and civil society in Sudan. We also encouraged the Swiss Federal Institute of Aquatic Science and Technology (EAWAG) to critically review the Merowe assessment.

EAWAG's review is very critical of the Lahmeyer report. EAWAG comments:

"It does not appear that Lahmeyer, the author of the EIA report on the Merowe

Dam, have carried out any kind of technical studies reasonably expected to evaluate environmental impacts for such a major project. Key environmental issues such as sedimentation, irrigation, water quality, reservoir and downstream ecological impacts resulting from water regulation were ignored or simply predicted not to occur."

Important environmental data regarding the Merowe Dam have never been compiled, or have not been disclosed to the public. In spite of this limitation, EAWAG was able to predict that the dam would have the following environmental impacts:

Fluctuating water levels: Dam operations will cause the downstream water level to fluctuate by 4-5 meters every day. On an annual basis, the reservoir surface will fluctuate between 350-800 square kilometers. The strong daily and seasonal fluctuations will erode the river banks, and make it difficult for farmers to draw water from the river and reservoir for agriculture.

Sedimentation: Up to 130 million tons of sediment will be deposited in the reservoir

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A few hours later, we call the ARSEL official. "Next Monday," he tells my colleague over the phone. Not this afternoon, not tomorrow, but in one week. Hmm...If we were assured that the study is available in his office NOW, why wait one week? No explanation is given.

October 31: Two of us climb back into a taxi for another trip across town to the ARSEL office. This time, the official states that he did not, in fact, have the final version of the EIA. "Only two print copies were made," he confides, "and given to the Ministry of Energy and Water." He has one electronic copy of a non-final version and had asked the French-based consultants to please send the final version to him. With a broad smile, he assures us that he will call the next day. While I made sure that he had our mobile numbers before leaving his office, we never receive the call.

November 2: GVC hand-delivers a letter to the ARSEL office demanding the immediate release of the EIA. The man in charge is not there. No response is received.

November 15: GVC publishes an open letter to the Prime Minister, criticizing the lack of transparency on the project. In

response, the Ministry of Energy invites them to a meeting. But when GVC staff arrive, they are left waiting for two hours, only to be told to return later. That afternoon, they wait again, and are instructed to return at a specific time later in the week. Again, they return, but are never received.

December 27: Most offices are closed for the holidays. *Ring, ring.* "Terri Hathaway, I have a CD copy of the Lom Pangar EIA for you. You can pick it up today." It is the local IUCN office, which had been marginally involved with the EIA. Their office has been outsourced by government to publicly disseminate the EIA. They seem to believe that giving me one copy fulfills their duty; I assure them that it does not. A series of phone calls commences the process of distributing the EIA to concerned groups. And this was the easy part.

Lessons Learned

After two months of visiting offices, writing letters, and trying to apply pressure to a stubborn authority, NGOs have the prized document. But this two months of jumping through hoops could have been devoted to critical review and substantive analysis of

the EIA. And now, an unacceptably shortened period of less than two months is given by the authorities for NGO comments.

The battle for documents is not only waged in the offices of power-hungry administrators. Other hurdles to effective advocacy are everywhere: hours spent preparing and delivering a formal request for a meeting with officials; public holidays declared only a day in advance; internet connections that slow down or stop. For anyone trying to get something done, waiting seems to consume half of the work day: at an office, at the bank, for a taxi, for copies, for a free computer at the internet café. Patience is mandatory and persistence an absolute for any activist in Cameroon.

GVC has joined many other African groups in pressing for the kind of transparency and inclusive processes for dam planning as recommended by the WCD. The WCD states: "Public acceptance of key decisions is essential for equitable and sustainable water and energy resource development." When governments and dam builders withhold information and leave civil society out of the process, they are ultimately shooting themselves in the foot. ■

Voices from the Frontline

Asian Activists Speak Out

by Melanie Scaife

In November 2005, more than 120 people from across east and southeast Asia gathered in Siem Reap, Cambodia for the third meeting of Rivers Watch East and Southeast Asia (RWESA), a regional network of affected people and activists that works to stop destructive river development in the region. Here some RWESA members talk about their struggles for free-flowing rivers.

Songkhram River Basin

From 2003-04, the World Conservation Union and the Southeast Asia Rivers Network, in partnership with the Nakhon Phanom Environmental Conservation Cooperation, helped villagers from four Lower Songkhram River Basin villages conduct Thai Baan research. Thai Baan – meaning Thai villager – is a form of participatory resource research that turns the tables on traditional western academic research methods. The villager assumes the role of researcher and is the owner of the knowledge, while the academic works as the research assistant.

Suriya Kotamee, Thai Baan researcher from the Songkhram River Basin

“Villagers have benefited from their Thai Baan research. Now they understand their own natural resources better than before. They are able to take the research results to other forums, whether it is with the government or other groups, and share the results. They have also started using the research for managing natural resources, like making fish



Suriya Kotamee

conservation pools or replanting the forest. The local and provincial governments accept the results and are joining in the process. Just a few months ago there were people from government institutions and local NGOs joining together with the villagers to replant the forest.

“At the end of the project the local people not only have the information, but they have also learned how to work together and have developed a good process for conservation. The process is dynamic – it does not stop, it keeps going, and in the future the villagers have a plan.”

H.E. Mr Ly Thuch, Chairman of Commission on Planning, Investment, Agriculture, Rural Development, Environment and Water Resources of the National Assembly of the Kingdom of Cambodia. “Rivers can tell the history of human beings. We inherited the rivers from our forefathers, and these rivers are still feeding us. These rivers provide water for food, water for agriculture, water for living, and waterways for transport. Moreover, we are getting fish from aquaculture systems. Rivers create fertile soils on which our agriculture systems have been developing. Rivers provide water power for energy.

“Water is life. Without water, there will not be any kind of life on earth. Without rivers we will not have sustainable water sources for human beings. Without proper watch or care, our rivers are in danger. Therefore the ‘River Watch’ is concerned with everybody – not only us, but all human beings.”

The Sesan

The Sesan River is one of the largest Mekong tributaries, flowing westward from Vietnam’s Central Highlands through Northeastern Cambodia before joining the Srepok and Sekong Rivers. In 1993, Vietnam began building the first and largest of several hydropower dams planned for the Sesan in Vietnam’s Central Highlands, about 80 kilometers from the Cambodian border. The 720 MW Yali Falls Dam was completed in 2001. Despite the dam’s adverse impacts on the Sesan’s downstream hydrology, fisheries, water quality and livelihoods, no notification was given to the villagers living along the river. Four more dams are currently

under construction downstream on the Sesan River in Vietnam.

Sai Bunlamb, villager from Ta Lao village, Ratanakiri Province, Cambodia

“At the early stages of the Yali Falls dam construction, people living on the Sesan River didn’t know a dam was being built upstream. People used to be very happy. They were able to catch fish from many places.

“At first, my community didn’t know why the flooding happened – the water flooded our rice fields, destroying our rice. When we



Sai Bunlamb

returned to our village after the flooding, we saw that our chickens were washed away. Villagers are scared now of the water fluctuations. Many people have moved away. The vegetable gardens on the river

banks have been badly affected.

“Our community asks us to do whatever we can to return back the natural flow of the river. We request that the government and the dam builders compensate us for what we have lost so far. We ask them to stop new dam construction – these are the requests of the community.”

The Srepok River

The Srepok River begins in Vietnam’s Central Highlands’ province of Dac Lac before flowing into Northeast Cambodia. The Vietnamese government is currently constructing three more hydropower dams on the Srepok River (the Dray H’Linh 1 dam was completed in 1990). There are also plans for three more dams on the Srepok River to be built in both Vietnam and Cambodia.

In 2005, Cambodian villagers joined together to form the “3 S Rivers Protection Network,” which aims to protect the rights of communities living along the Sekong, Sesan and Srepok Rivers. The three rivers together form the most important tributaries of the Mekong River in Cambodia, and contribute about a fifth of the Mekong’s flow.

continued opposite

They are under threat from numerous dam plans in Vietnam and Laos.



Sin Tong Lao

Sin Tong Lao, villager from Lumpait town, Ratanakiri Province, Cambodia

"I've lived by the Srepok River since I was young. It used to be easy for my family to earn money; we fished and had a small vegetable

garden close to the river. Every day I collected vegetables and fish to sell in the market. Now the water levels always change – sometimes up, sometimes down – making it difficult to grow vegetables along the river or to catch fish. The water quality has changed as well. We have set up a village working group with support from the 3 S Rivers Protection Network and we organize meetings with villagers in the district to discuss how to overcome these problems."

The Nu River

In April 2004, Chinese Premier Wen Jiabao suspended plans for dams on the Nu River after an unprecedented outcry by NGOs, academics, government officials and the media in China and internationally. While the projects may still be approved, the campaign by Chinese journalists and NGOs has inspired a national movement to protect and restore China's rivers.

Wang Yongchen, journalist and member of Green Earth Volunteers, China

"Before I visited the Nu River I had just heard about the area and that 13 dams were going to be built. Immediately I told myself *go!* – then share this information with more people, because something is happening to nature. In 2004, together with 20 journalists, I conducted interviews there. I found not only is nature so beautiful, the cultural diversity is so rich and I understood why this area is so special – there are so many cultures, so many traditions. Everyone in China is thinking we are developing economically so quickly but we have forgotten sustainable development, we have forgotten nature.

"China's NGOs and civil society are increasingly showing their strength in terms of encouraging the general public to participate on important issues such as dam building and environmental degradation in China. Just recently, 92 NGOs and more



Wang Yongchen

than 450 individuals signed a letter to call for the public disclosure of environmental impact assessments of the Nu River dam development. This really is a landmark for NGOs to join hands together and call for more public participation in the decision making process."

Houay Ho Dam

In 1994, Korean company Daewoo made an agreement with the Lao government to build the Houay Ho Dam in Southern Lao PDR. The dam was completed in 1999 and has since been bought by Belgian company Tractebel. As part of the dam development process, 12 villages were targeted for resettlement: 1,895 people were relocated, or 40% of the ethnic Nya Heun population. The Nya Heun were resettled on the west side of the Se Namnoy river, an area owned by the J'rou ethnic group, about 30 kilometres or a day's walk from their homeland. (See p. 12 for an article about this dam.)

Ethnic Nya Heun man from Paksong district, Champassak province, Laos

"We want to hold accountable those companies that built or profited from the dam – the Korean company that built it or the Belgian company that owns the dam now. There should be letters sent saying, 'You are making money from this, why don't you take some responsibility and help all those people impacted by this project – allow them to move back?' We need to have enough land for us to be able to farm, which means moving to areas we consider our old territory, and we need to be given the right to live there with self respect and independence."

The author is with Oxfam Australia.

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every year. As a consequence, the storage capacity of the reservoir will be reduced by 34% within 50 years. This will make traditional flood recession agriculture along the river course impossible, and will seriously diminish the capacity of the project to generate electricity.

Aquatic ecology: Baseline data on the aquatic ecology in the region are scarce. The dam will certainly block fish migration. The fluctuation of the water levels and erosion of the river's banks will destroy the spawning areas of fish and the habitats of other organisms.

Water quality and health: Pollution and the decomposition of organic matter could, according to EAWAG, "create public

health hazards for people drinking water or eating fish from the reservoir." In addition, the stagnant water of the reservoir can "create perfect breeding conditions for mosquitoes, vectors of malaria and yellow fever and the water flea host of the guinea worm." The reservoir will also evaporate a lot of water: EAWAG estimates about 14% of the reservoir volume (or 2% of the Nile flow) will evaporate every year.

Climate change: According to Lahmeyer, "the greenhouse gas emissions from the Merowe project are considered to be non-significant." Yet the EAWAG review points out that large amounts of plants, algae and soil will be produced or deposited in the reservoir, and will decompose. This will emit

450,000-1,000,000 tons of carbon dioxide and 38,000-88,000 tons of methane, a particularly potent greenhouse gas, per year.

The Nile valley is the lifeline of Sudan. Building Africa's largest hydropower project on this lifeline without a comprehensive, thorough environmental impact assessment amounts to flying blind. The involvement of major international contractors in this project shows that in spite of many rhetorical commitments, these companies have no minimal standards of environmental responsibility. ■

The EAWAG review can be downloaded at <http://www.irn.org/programs/merowe/>

Disconnected Rivers

The book Disconnected Rivers by Ellen Wohl (Yale University Press, 2004) reveals how human activities have impoverished US rivers and impaired the connections between rivers and other ecosystems. The following excerpts describe the natural interactions that make for a healthy river, and an effort to restore the channelized Kissimmee River in Florida.

Rivers reflect a continent's history. Where forces far beneath the Earth's crust force up mountain ranges, rivers flow swift and cold down steep, boulder-strewn channels. Where the Earth is still, rivers meander broadly, depositing thick plains of sand, silt, and clay.

Rivers also reflect a people's history. Where people clear the forests for agriculture, river valleys retain sediments, recording the transitional period when the soil washes down from the hill slopes, and rivers become broad and shallow. Where people mine metals from hills or build factories, river valley sediments contain the toxic by-products of these activities. People build canals, roads, and railroads along river corridors, following river passages through dense forests or steep mountains.

The organisms living in and along rivers also reflect this history. Along a river downstream from a site where mining occurred in the 1890s, there are fewer individuals and species of aquatic insects and fish in the 21st century because toxic metals still leach from the mining site. Where a river repeatedly shifted its course back and forth across the valley bottom during floods spread across 200 years, cottonwood seedlings have sprung up on each new sandbar created by a flood. Now the river has groves of cottonwoods aged 10, 40, 80, and 175 years, and these trees map the changes in the river's course.

The physical forms of rivers and river ecosystems are our historical archives, yet these archives are challenging to interpret. Gaps may be present in the physical record where sediments deposited during an earlier period of river history were subsequently eroded. Because of the gaps we can seldom decipher a complete and continuous record of a river's history. But by assembling the records from many rivers we can piece together regional and continental syntheses of history.

The form or physical appearance of a river can be readily perceived. People commonly expect a "healthy" river to be pretty; to have clear water, stable banks and bed, and perhaps a fringe of trees along the banks or fish in the pools. These expectations of a healthy river's appearance may be misleading in that they ignore loss of function. It is difficult to assess a river's function, however, with only a casual examination. River channels are fundamentally conduits for water and sediment, but the specific processes of water and sediment movement vary widely among channels. These processes create unique habitats and patterns of nutrient exchange to which the local in-channel and floodplain communities of plants and animals are adapted.

A functional river ecosystem is connected to everything around it: the atmospheric and oceanic circulation patterns that control precipitation over the drainage basin; the soils developed on the slopes adjacent to the river during thousands of years of weathering of the underlying bedrock; the plant communities growing on these soils, and the animals that pollinate and consume the plants; the processes by which precipitation filters down to the groundwater and raises or lowers the water table that is intimately connected to most streams, and on and on. By altering our river systems we have, in many cases, severed these vital connections. Dams interrupt the upstream-downstream passage of fish, the downstream flow of seeds that replenish riverside forests, and the downstream movement of water and sediment. Timber harvests short-circuit the gradual downslope flow of rainwater below the ground, instead sending masses of water and sediment quickly into nearby rivers. Artificial levees keep young fish from the rich nursery habitats created by warm, shallow waters spreading across a floodplain during high flows and prevent the pulse of nutrients returned to the channel as floodwaters

A Geologist Explains the Consequences of Reshaping Rivers

recede. Disconnected rivers become impoverished in form and function because the processes maintaining form and function no longer operate.

Rivers in Chains

Channelization is the widening, deepening, clearing, and/or straightening of river channels. Such activities are undertaken for several purposes. Channelization drains wetlands by speeding the passage of water through the wetlands and lowering the groundwater table. It reduces flooding of adjacent lands by increasing the river's capacity to transport flood flows, or enhances navigation by increasing the natural depth of larger rivers. It also controls erosion by substituting artificial canals for gullies or other eroding natural channels. Individuals or local communities have undertaken channelization for two centuries in the US, but the practice became much more extensive under the supervision of the federal government during the 1940s. More than 34,000 miles of waterways were channelized by the Army Corps of Engineers and the Soil Conservation Service after 1940.

It became apparent within 30 years that channelization had some unanticipated consequences. A 1973 congressional report noted that most of the open ditches constructed before 1940 to drain wetlands were poorly engineered, poorly maintained, and poorly designed in relation to their larger watersheds. Consequently, the local entities constructing ditches solved the flood problem by dumping it downstream. The federally financed channelization projects of the 1940s to 1970s were not much better. The 1973 report on these more recent projects is damning. The report emphasizes that "inadequate consideration was being given to the



Florida's Kissimmee River. Photo: Brent Anderson/SFWMD

adverse environmental effects of channelization. Indeed, there is considerable evidence that little was known about these effects and, even more disturbing, little was done to ascertain them."

Scientists have demonstrated the adverse environmental effects of channelization to be many and various. In addition to loss of upland soil, adverse lowland effects include impacts to wetlands, riverside vegetation, river form and flood flow, and aquatic organisms.

Drainage of wetlands lowers the local groundwater table, changing the water cycle and availability of nutrients for wetland plants. This eliminates or reduces the number and diversity of plant and animal species living in and using the wetlands. As the

water table declines, the water-holding capacity and the capacity for groundwater recharge also decline.

Periodic flooding and lateral channel movement are natural disturbances that create spatial variability in bottomland forests. Stabilizing a river reduces variability through time and across the bottomland. Eventually, the bottomland forest shifts toward a homogeneous community of species less tolerant of flooding, which occupied the outer floodplain before channelization.

Direct cutting of riverside trees during channelization eliminates shading and the input of organic matter such as leaves and twigs to streams. With the trees and their binding roots gone, the streambanks are more susceptible to erosion. Flow velocity is not as effectively reduced along the now-smooth streambanks, and sediment is less likely to be deposited in natural levees. Cutting of bottomland hardwoods eliminates vital habitat for many animals and can increase nutrient and sediment concentrations in adjacent stream channels.

The Kissimmee

The Kissimmee River of Florida, now the center of a massive restoration effort, further illustrates the consequences of channelization and the steps necessary to rehabilitate channelized streams.

Florida is flat. Along the course of the Kissimmee River in southern Florida, the adjacent "uplands" are only 6 to 10 feet higher than the floodplain. The Kissimmee River once meandered in broad arcs across this floodplain, dropping 6 to 9 feet for every 100,000 feet traveled along its 100-mile-long drainage basin. Native Americans named the Kissimmee for its "winding waters."

From the air, the Kissimmee drainage basin looks as though someone had thrown a handful of pebbles through a layer of brilliant green pondweed, leaving many little clear holes to the water beneath. These holes are karst lakes, for the "pond" beneath the green of the basin is a vast layer of carbonate

rocks honeycombed with water-filled caves and sinkholes.

Once the carbonate rocks of southern Florida lost the protection of the ocean in which they formed, the rocks slowly began to dissolve. Most rainwater is slightly acidic, and it reacts with carbonate rocks, dissolving the calcium from the rock and carrying the calcium away in solution, leaving sinkholes. Water fills the sinkholes to create lakes and spills across the lowlands to form rivers and adjacent wetlands. Before European Americans intervened, the different components of this giant sponge were subtly but intricately connected. Rain that fell on the interior was carefully used, soaked up, and filtered through a huge landscape and passed on from organism to organism, nourishing the rivers, lakes, prairies, and wetlands. Black, organic-rich water drained slowly into Lake Kissimmee in the middle of Florida and then down into the Kissimmee River.

During wet periods the waters flowed south in a broad band, inundating a floodplain up to three miles wide. Eventually, the waters coalesced into Lake Okeechobee ("big water" in Seminole) and then spilled out once more to filter down through the Everglades in broad sheets. Rains during the summer and autumn covered the floodplain for 3 to 9 months each year, and periodically for the entire year. This flooding supported an annual invertebrate production on the floodplain up to 100 times greater than the production in the stream channel. As water levels declined each year, the invertebrates were carried into the river, where they served as food for many other animals. The life cycles of water birds and fish were also linked to flooding. Wood storks ate fish concentrated at water holes during the winter, and snail kites fed on apple snails whose egg laying was tied to seasonal water fluctuations. Fish used the floodplain habitat for spawning and nursery areas. Years with a smooth increase in water level, and with large floods that lasted a long time, were good for the 35 species of fish in the region.

Human population and infrastructure began to increase more rapidly in the Kissimmee River drainage basin after World War II. A major hurricane in 1947 resulted in extensive flooding and property damage, and the Army Corps of Engineers stepped in. Congress authorized the Kissimmee River Flood Control Project in 1954. Between 1962 and 1971, the corps dredged a trapezoidal canal from Lake Kissimmee to Lake Okechobee. The canal is about ten times the size of the natural channel, with six water-control structures that regulate water levels and flow,

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The Forgotten People of the Boloven Plateau

The Houay Ho Dam has displaced 2,500 ethnic Heuny and Jrou people from the Boloven Plateau in Southern Laos. **Melanie Scaife** talked with a local man about the conditions for dam-affected people.

Mr. Boun is an ethnic Heuny (Nya Heun) man. His ancestors have lived on the Boloven Plateau in Southern Laos for generations. But Mr. Boun and his fellow villagers' homes now lie empty or submerged in water, following the construction of the Houay Ho hydroelectric dam on a nearby tributary of the Mekong.

"Before the dam was built we used to have enough to eat," says Mr. Boun. "We fished the rivers, collected vegetables in the forest and had plenty of rice. We lived on our own without having to depend on aid or support from anyone else. Now in the resettlement areas, we are totally impoverished and dependent on others."

Houay Ho was built by Korean company Daewoo and Thai company Loxley and completed in 1998. From 1997 onwards, some 2,500 ethnic Heuny and Jrou (Laven) people from 11 villages located on the Plateau were moved to three resettlement sites to make way for the dam.

A lack of rigorous planning and absence of measures designed to protect the environment and local communities has resulted in serious water shortages, food insecurity, a lack of land for cultivation and economic

instability for the people of the Boloven Plateau.

Mr. Boun was moved to a resettlement area about 30 kilometers – or a day's walk – from his original home.

The Heuny's livelihoods – reliant on access to forests and rivers – have been severely affected by the move as they now find themselves in what has been traditionally the Jrou's territory.

"We need enough land – this is the basic problem of our people," says Mr. Boun. "We don't have access to resources now because we have been moved into an area with no forest or land to call our own."

"My people used to live in a very big forest and were used to living in an expansive area with a lot of natural resources. Now we've been put in a very concentrated area where all the resources around us are owned by somebody else and it's a huge shock for us, a huge change from what we were used to."

Faced with the loss of their traditional livelihoods, many villagers are now forced to sell their labour in order to feed their families.



The resettlement site at Huay Ho.

"Mostly we are hired to do weeding in neighbouring villages," Mr. Boun explains. "Because we are living in an area with a low demand for labour, and have no other place to go, we are hired at very low wages. Sometimes we are given a kilo of rice a day for our work – just enough to eat for one day."

The limited amount of land available for agriculture and its subsequent impact on traditional livelihoods is a serious problem facing the Heuny, but so too is the psychological impact of being uprooted from their ancestral homeland.

"Some people thought they would get sick when they moved and they felt it was like being moved to a different country," says Mr. Boun. "This is one of the huge problems with the resettlement – that people have been moved out of the area they consider to be theirs to a foreign land. Their sense of place, their sense of home, has been destroyed."

Communities are forbidden from returning to their former lands, but over the past few years, villagers have started protesting with their feet.

"We are returning as close as we can to our old territory, to land not flooded by the reservoir," says Mr. Boun. "We are not allowed to move back to our old areas, so officially we are living in the resettlement sites but in reality we are hardly there at all."

"Last year about half of the families abandoned the resettlement sites – this year it's up to two thirds. At this point the government has not actively stopped us from moving back but in the future, who knows?"

Mr. Boun believes the Lao Government only chooses to see the benefits of dam con-

continued opposite

Holding the Project Owners Accountable

Should the new owners of a dam be responsible for the impacts caused by a former owner? This is the dilemma being faced by NGOs who are trying to hold Belgian company, Suez-Tractebel, accountable for the impacts to communities displaced by Houay Ho. In 2001, Tractebel bought Houay Ho Power Company from Korean company Daewoo. In 2004, Proyecto Gato, a Belgian NGO, filed a complaint to the Belgian National Contact Point (NCP), a governmental body that oversees compliance with the OECD Guidelines for Multinational Enterprises. Proyecto Gato argued that Tractebel – as the dam's major shareholder – should be responsible for providing adequate compensation to people forced off their land to make way for the dam. They also asked Tractebel to make basic health care, education equipment and medicine available to resettled villagers.

Tractebel argued that it wasn't responsible as the resettlement was carried out before their involvement. The NCP supported Tractebel's argument, citing a letter from the Lao Minister of Industry which stated that Tractebel had fulfilled its contractual obligations to the Lao government.

The complaint did cause Tractebel to invest in repairing and upgrading the water systems in the resettlement area, but the essential issues of land and livelihood have not been resolved.

Jan Cappelle, Proyecto Gato, Belgium

Disconnected Rivers continued from page 9

creating a reservoir upstream of each structure. In most areas of the world, roads go downhill into a valley to cross a river. In southern Florida, the rivers are walled within levees that sit above the surrounding lands, and roads rise up to cross a river.

The Kissimmee River Flood Control Project did alleviate flooding, but it also largely destroyed the floodplain ecosystem. Dredge material from the canal buried 6,900 acres of floodplain wetlands. Another 35,000 acres were altered by the loss of seasonal flooding. Remaining segments of the natural channel carried little or no flow. As several inches of organic muck accumulated over the sandy bottoms of these channel segments, the stagnant water became anoxic, with little oxygen available to aquatic plants and animals. Levels of phosphorus entering Lake Okeechobee increased from 100 to 500 tons per year as dairy, citrus, ranching, and sugarcane operations spread through the former wetlands. The excess nutrients created algal blooms that depleted oxygen levels in the lake waters, destroying the abundance of autumn insects that had fueled migratory birds on their way.

Almost as soon as channelization was complete in 1971, public outcry galvanized political resolve to restore the Kissimmee ecosystem. The Florida legislature passed the Kissimmee River Restoration Act in 1976. Activities are now being undertaken to restore ecological integrity. Ecological integrity of the Kissimmee River is to be judged by five factors. The first of these is the energy source to fuel the lifecycle, which depends on inputs of organic matter. In other words, is there enough mass of plant material to produce the nutrient-rich muck on which all other life depends? A second factor is water quality, judged in terms of temperature, turbidity, dissolved oxygen, and other characteristics. Is the water warm and clear and oxygenated enough to support insects, fish, turtles, and alligators? Habitat quality, as judged

by streambed composition, flow depth, flow velocity, and diversity, forms a third factor. Hydrology, measured as flow and variability of water flow through time, is the fourth factor. Finally, biological interactions, including competition, predation, disease, and parasitism, must be restored.

**We have taken rivers
for granted for centuries,
and we continue to do
so at our peril.**

The Restoration Plan

In order to meet the flow criteria set by project scientists, program managers evaluated three plans, each of which proposed a different method to divert water from the canal back to the remnants of natural channels. Managers eventually decided to remove two of the existing six water-control structures, backfill 22 miles of canal, re-excavate portions of the river channel that were destroyed, and purchase about 70,000 acres of floodplain through the State of Florida, all at an estimated cost ranging from \$280 million to \$422 million. This is one component of the \$7.8 billion Comprehensive Everglades Restoration Plan, a massive experiment to determine whether we can in fact undo our negative impacts. Money is not everything, but it is a crucial component of the restoration process. A National Research Council report issued in 2003 noted that inadequate funding was hampering Everglades restoration efforts.

Managers installed three weirs across a portion of the canal below Lake Kissimmee between 1984 and 1989 as a demonstration project. The weirs simulated the effects of

dechannelization by diverting flow into remnant river channels and floodplains. The demonstration project had some encouraging successes. The diverted flows increased dissolved oxygen levels in the river water. The flows carried downstream the fine sediments that had accumulated in the river since channelization and restored the sandy streambed. The flows also re-contoured the uniformly flat, shallow channel into a channel with pools and sandy riffles. As the physical integrity of the river was restored, biological integrity also began to recover. Bottom-dwelling invertebrates became more numerous and diverse. Game fish became more abundant. But the demonstration project also indicated the limitations to river rehabilitation. More complete restoration of the river's biological integrity requires the re-establishment of historical flow patterns. As cautiously summarized by the editors of a special scientific volume on the restoration effort, "With all our expertise in ecosystem restoration, it is widely recognized that it is unlikely that the full spectrum of structural and functional attributes of the system can be restored to the levels existing prior to the disturbance." All the king's horses and all the king's men couldn't put Humpty together again ...

End Note

We all live among rivers. They are the sinews that bind our landscapes together. I have come to feel with increasing urgency that as we unwittingly strain or cut those sinews, we threaten the integrity of the whole environment on which we depend. We have taken rivers for granted for centuries, and we continue to do so at our peril. We cannot continue in this manner for much longer. We need to keep trying to restore rivers, but our efforts must reflect knowledge, patience, and a willingness to learn from past mistakes. Our rivers deserve nothing less. ■

Boloven Plateau continued from page 10

struction – the generation of power and export income – while ignoring lessons to be learned from failed dam projects of the past.

"The Lao Government is building new dams and it claims it's going to do such a great job but where's the effort to solve the problems of the old dams? Meanwhile, the people of the Boloven Plateau have been forgotten, languishing in failed resettlement sites and living a tenuous existence."

For Mr. Boun, the solution is clear. "We need to have enough land to farm which means moving in to areas that we consider our old territory, and we need to be given the right to live there with self respect and independence."

Houay Ho dam is now owned by Belgian company Suez-Tractebel, together with an unnamed Thai partner, which bought the dam in 2001. Mr. Boun's message to the new owners is unequivocal: "One: take responsi-

bility for the dam's impacts. Two: help us return to our home." ■

For more information about the Houay Ho dam, download a field report from a visit to the resettlement area at http://www.irn.org/programs/mekong/Houay_Ho_2004.pdf.

Melanie Scaife is a Communications Editor with Oxfam Australia and attended the Rivers RWESA Meeting in Cambodia in November 2005.



CHILE: Ricardo Lagos, the President of Chile, on February 2 cautioned that decisions on new hydroelectric projects being proposed for Chilean Patagonia by the Spanish company Endesa should be deferred until the projects' potential impacts are fully evaluated. In a visit to Aysén, the zone where the dams are being planned, Lagos said, "Here, we do not want to destroy nature, and if that is what the dams will cause, we will have to say no. If they are compatible with progress, we can say yes, but only preserving what we have here. And lots of conditions would have to be met."

Lagos' statement was received favorably by critics of the project. The president of the Private Corporation for the Development of Aysén, Miriam Chible, said, "This has been our position from the beginning. The project is not feasible as proposed... Producing hydroelectricity in Patagonia would mean the loss of those characteristics which make it exceptional."

Endesa plans to build four dams on the Pascua and Baker rivers, and a 1,500 km power line to link these dams with the central electricity grid. The company has only recently applied for permission to begin exploratory activities aimed at completing the projects' feasibility studies. Dozens of opponents of the projects – including environmentalists, local land owners, ecotourism companies, and salmon farmers – submitted objections to the licensing request, and a decision by federal authorities is pending.

Despite Endesa's lack of authorization to begin studies, local residents say the company has, in effect, already invaded Patagonia. The Group of Defenders of the Spirit of Patagonia, a local organization of some 200 people who would be directly affected by the dams, delivered a letter to Lagos denouncing "unauthorized work by dam contractors carrying out activities in natural protected areas and on private property."

Chilean Patagonia is considered to be the home of some of the most pristine ecosystems on the planet, including glaciers and glacial lakes, wild rivers, temperate rainforests, and steppes, which support many endemic species. There is broad concern that the construction of the dams and power lines could seriously harm the region and eliminate the potential for thriving alternative economic activities, such as ecotourism.

At press time, Chile's Superintendent of Electricity and Fuels had extended the time limit for citizens to register objections to Endesa's request for the right to enter private property to carry out feasibility studies for the dam. Dozens of petitions by property owners and environmentalists have flooded the agency, even as Endesa has begun drilling and blasting in the region. Local environmentalists have accused the company of carrying out unauthorized studies on public lands, including protected areas in the region.



Endesa's dam planners not welcome in Patagonia.

CHINA: Three Gorges Dam is threatening one of the world's biggest fisheries, according to a February 25 report in *New Scientist* magazine. The dam, the world's largest, blocks the mouth of the Yangtze River about 2,000 kilometers upstream of the East China Sea.

Scientists at the National Taiwan Ocean University have been monitoring the East China Sea ecosystem since 1998. Within two months of the reservoir's first filling in June 2003, they detected a massive decline in the phytoplankton that forms the base of the food chain.

The team measured the amount of carbon dioxide being absorbed by the phytoplankton before and after the dam's construction. Areas of high CO₂ absorption correspond to high levels of phytoplankton, which supports a rich fishery. The researchers found that by August 2003, the 114,000-square-kilometer "high-productivity zone" surrounding the mouth of the Yangtze had shrunk by about 86%.

This is probably because of reduced flows out of the Yangtze, says Gwo-Ching Gong, who headed the university research team. Though the Chinese government has

promised not to decrease the total annual flow into the sea, the water may not be released at the right time. Phytoplankton need fresh water in the summer flood season to maintain high productivity. Unfortunately, that's when farmers need the most water for irrigation. "They may try to release more fresh water during the fall season to compensate for the whole year," Gong says, "but it cannot stimulate high productivity, so there's no use for it then."

The team also found that sediment loads at the river mouth have decreased by more than half since before the reservoir was filled. Chemical changes in the water have caused a shift in the dominant species of phytoplankton to a type that can kill fish by depleting oxygen in the water or secreting toxins.

Gong estimates that annual catches will be reduced by about one million tons because of the dam. Scientists believe the problem will only get worse if the government builds the half a dozen more dams it has planned for the Yangtze.

MALAYSIA: Transnational aluminum smelters have been showing interest in tapping the power that will be produced by the problem-ridden Bakun Dam, according to InterPress Service.

The controversial 2,400MW dam in Sarawak, on Borneo island, was originally scheduled for completion in 2003, but is now not expected to generate electricity until late 2009. One of the problems plaguing the project has been a lack of demand for the power that will be produced by the dam. Because Sarawak has so little demand for electricity, the Malaysian government needs to attract an energy-intensive industry such as aluminum in order to justify the dam's construction.

"It's utterly unnecessary," said one Sarawak-based political analyst of the dam, who asked not to be identified for fear of repercussions. "The only people who need the dam are the Sarawak politicians and their cronies."

The government has already invested around \$500 million in the project. As luck would have it for the government, rising costs for electricity and raw materials have forced many aluminum plants in the US and Europe to close down in recent years. Major smelters are now scouring the globe for places where electricity is cheap. Bakun is just the latest in the aluminum industry's global "electricity prospecting."

Smelters from China, the world's largest aluminum user, have been showing a particular interest in Bakun. Last year, IPS reports, more than 40 smelters stopped production

in China due to higher costs and government moves to curb pollution.

Apart from the questionable need for Bakun, environmentalists are worried about the polluting effects of smelters.

"Communities in the adjacent areas would be affected by its polluting emissions, once it is built," said Wong Meng Chuo, a college lecturer and social activist who spent many years working among communities in Sarawak. "It is also of concern that the industry would bring changes to the social structure as well as to the cultural practices of the community."

A BETTER WAY

FUEL CELLS: A South African firm and its US partner were awarded a \$3 million grant by the International Finance Corporation (IFC), the private-sector arm of the World Bank, to help install 400 fuel cells in South Africa over the next three years. The company, IST, said the project would help reduce the impacts of the nation's recent regional power shortages, and bring power to areas where grid power was either not available or unreliable.

"The project will represent the largest number of commercial fuel cells to be installed in a developing country to date," said IST spokeswoman Prithinee Naidoo.

The fuel cells, which use fuel such as methane to produce an electric current, would generate about 2 megawatts – enough electricity to power 1,300 households, according to *Business Day*.

GREEN ENERGY CREDITS: Whole Foods Market, the American health food giant, has become the first major US company to convert all of its energy to green sources. In January the grocery chain announced plans to become the largest buyer of wind energy credits in North America by purchasing credits equal to 100% of its projected energy use for 2006.

The move will cut carbon dioxide emissions by the same amount as taking 60,000 cars off the road for a year or planting 90,000 acres of trees to absorb the gas, according to the US Environmental Protection Agency.

"In the corporate world, this is huge," says Kurt Johnson, head of the EPA's Green Power Partnership. "When a market leader does something like this, others will emulate."

WIND: Today, some 12 years after war and genocide in Rwanda left almost one million people displaced and struggling, a large portion of the population still lacks basic amenities such as clean water and energy. Rwindalelectric Inc is a new nonprofit focused on bringing electricity to rural villages in Rwanda, with an emphasis on wind energy. *ESI Africa* reports that Rwindalelectric's goal is to construct small wind farms in rural villages, using small-capacity turbines (50 to 500 kW) that are being phased out in the US and Europe as they are being upgraded to larger units (up to 3 MW). While no longer commercially viable in these countries, these turbines represent a proven product that has the potential to bring electricity to many remote areas. If they can be

obtained at low cost, local labor and materials can be used to construct a tower, install a turbine, operate the equipment and perform the necessary maintenance.

According to *ESI Africa*, Rwanda's minister of energy has estimated that a wind farm of 63 turbines producing 50 MW of electricity would cover the basic electricity needs for the entire country.

SOLAR: California regulators directed utilities in January to spend nearly \$3.2 billion on solar systems to help relieve a shortage of electricity. The solar energy plan, approved on a 3-to-1 vote by the California Public Utilities Commission, will cover roughly one-third the cost of solar systems through rebates over 11 years. The program is intended to encourage both business and residential customers to install enough rooftop solar energy systems to generate 3,000 megawatts of electricity – enough power to serve about 2.2 million homes and eliminate the need for six modern power plants. The program will be funded by a new \$1.10 monthly fee on residential power bills. The program will make the state one of the world's largest users of solar power.

Not to be outdone, on March 1, Arizona adopted a plan to require state utilities to get 15% of their electricity from renewable resources by 2025. About a third of this amount must be energy generated on the customer side of the meter. This could provide support for up to 2,000 MW of solar – on a per-capita basis, more than California's new solar initiative. ■



Kilowatt Ours: A Plan to Re-energize America, by Jeff Barrie (DVD, available from <http://www.kilowattours.org>)

Sometimes, the best possible response is to take things "too personally." Filmmaker Jeff Barrie was so offended by the rapacious practice of mountaintop removal coal mining and the impacts of burning coal on the environment and human health that he embarked on a national energy-conservation crusade. "Kilowatt Ours" is his delightfully personal documentary of what he has learned, and a tool to bring converts to his movement.

The film starts by graphically illustrating the horrible impacts of mountaintop

removal mining on communities in the coal-rich Appalachian Mountains. This shockingly crude practice literally blows mountains up to get at the coal beneath them. "They use 2,500 tons of explosives a day in Appalachia, and that's why I say we are under attack," says Judy Bonds, a community activist interviewed for the film. Adding insult to injury, the companies are allowed to dump the blasted debris into waterways; more than 1,500 miles of Appalachian streams have been buried by mountaintop removal debris.



"Kilowatt Ours" follows Barrie on his 18-month journey from the coal mines of West Virginia to the solar panel fields of Florida, as he learns about the problems

and solutions to America's lust for energy. He interviews energy activists, coal-affected community members, energy-efficiency experts, medical professionals, and school administrators (remarkably, schools in the US currently spend more on energy bills than they do on computers and text books combined). He asks average citizens if they know where their energy
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“Living Lakes” Brings Together Lake Protectors from Around the Globe

by Udo Gattenlöhner

“Water is the essence of life, but people need healthy lakes, rivers and wetlands for many more reasons,” says Marion Hammerl, President of the Global Nature Fund. “These diverse ecosystems provide products from fish to reeds; they help prevent floods and reduce levels of pollutants. But they are also sensitive and vulnerable habitats for a diverse flora and fauna.”

The Global Nature Fund, a non-profit NGO, launched the Living Lakes partnership in 1998. The aim of the Living Lakes network is to promote sustainable development objectives for the world’s lakes at the international level. Currently there are 40 member lakes and wetlands spread across five continents. More than 50 partner organizations – NGOs and public institutions – provide a fantastic wealth of experience and expertise. The partnership comprises lakes and water systems such as Lake Chapala, Mexico’s largest lake; Lake Constance, bordering Germany, Switzerland and Austria; Lake Victoria, Africa’s largest lake; the Greater St. Lucia Wetland Park, South Africa’s oldest nature reserve; Lake Baikal, the deepest lake in the world, and Lake Poyang-hu, China’s largest freshwater lake. Another Living Lakes partner, the Columbia River Wetlands in Canada, was designated as a Wetland of International Importance by the Ramsar Secretariat in June 2005, on World Wetland Day.

The underlying idea of the international lake network is to prepare the ground for an ongoing international dialogue between private and public stakeholders involved in

water issues as they pertain to the management of the world’s major lakes. Objectives are to optimize water management of lakes and river basins, and to further the exchange of know-how, technologies and experiences between environmental NGOs and other stakeholders of lake regions in moving Agenda 21 objectives from paper to practice. Living Lakes conferences are held annually to promote the exchange of experiences, formulate statements, coordinate individual activities and agree on further steps for common activities. Below is a sampling of some Living Lakes projects.

Lake Victoria: Solar power for fishers

The participants of the “African Living Lakes Conference,” held in October 2005 in Kisumu, Kenya, witnessed the first public demonstration of a new generation of fishing tools: solar lamps. Members of the Kenyan Living Lakes partner organization OSIENALA (Friends of Lake Victoria) demonstrated the use of the solar lamps, which were attached to a traditional mini-bamboo float.

Lake Victoria is the most densely populated area in Kenya. The main source of income of the local population is fishing. “Every day about 5,000 fishermen spend all night on the water, fishing sardines,” says Dr. Obiero Ong’ang’a, Director of Osiendela. “The fishermen cast their nets and attract the small sardines with bright kerosene lamps. The next day they lay out the catch to dry in the sun.” Hundreds of lamps flickering in the

darkness offer a fantastic spectacle at Lake Victoria every night.

The use of kerosene lamps, however, has many disadvantages: leaking kerosene threatens the environment and contaminates the lake water. Additionally, the price of this fossil fuel is high. Every fisherman needs about 6 to 8 litres kerosene per night, meaning

he uses 50% of his income for fuel. Against this background, the Global Nature Fund and its Kenyan partner organisation OSIENALA have launched the solar energy project at Lake Victoria. The goal of the project is to improve the income situation of the fisher families and reduce environmental stress on the lake.

This solar project has a micro-financing system so fishermen can purchase this new solar technology. Additionally OSIENALA has developed energy-efficient smoking kilns to reduce the deforestation around Lake Victoria, which not only reduces the families’ need for fuel, but also reduces erosion around the lake.

Wetlands and Estuaries

Tangible results have been obtained by the project “Sustainable Management of Wetlands and Shallow Lakes” program launched in 2001. The aim of this EU co-funded project was to demonstrate that it is possible to manage wetlands in ways that enhance their nature conservation value while meeting the social and economic needs of the local community. The regions that benefited from the project were the La Nava and Boada wetlands in Spain, and the Nestos River estuary in northeastern Greece. La Nava and Boada are especially important for flora and fauna, as they are situated in very arid areas and are an important wintering place for migratory birds. The Nestos lakes and lagoons in Greece are considered to be one of the ten most important wetland areas in Europe, but so far the area has not been granted protected status. The three-year project resulted in regional management plans being created to deal with the most critical environmental problems facing these watersheds. The plans include the installation of buffer zones around the lakes in order to stop nutrient pollution from agricultural run-off and wastewater entering the lakes; and guidelines for the treatment of sewage effluent and visitor management, among other things. ■

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Demonstrating solar lamps at a meeting of Living Lakes in Kenya.

Lake Victoria continued from page 1

This internal World Bank report also claimed that there was very little risk to the project becoming uneconomic because of changes to hydrology. Although it noted that “the hydrologic conditions are the single most important risk for an extension at Owen Falls,” the Bank and its consultant, Acres International of Canada, used limited and very optimistic hydrological data for the design of the extension project.

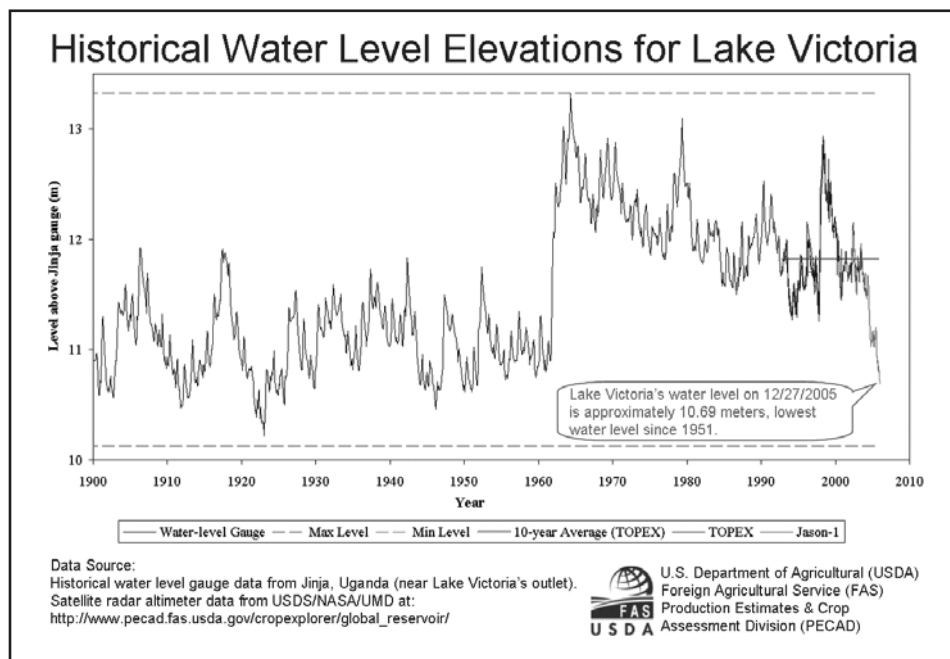
The Bank’s appraisal report explains: “In the period 1961-62 extra heavy rain, which

Key Findings on Lake Victoria’s Dam Drop

The Kull report’s key findings include:

- Based on the current Lake Victoria hydrology, as well as observations from the past 100+ years, the Owen Falls Dams are likely over-sized.
- The disturbing lack of public information on dam releases, dam operations and river flows makes it difficult for independent experts to soundly judge existing and proposed hydroelectric projects on the Victoria Nile.
- Experts conclude that future climate will likely involve drier conditions, lower lake levels, and lower downstream river flows, which will exacerbate these problems and make it increasingly more difficult for Victoria Nile dams to produce their projected power. This calls into question Uganda’s reliance on hydropower on the Victoria Nile as its primary source of electricity.

The report is available at www.irn.org.



persisted across much of Central Africa, raised the lake level by more than a meter. This high lake level has more or less prevailed since that time ... After a careful review of the hydrology of the Nile Basin, a reference hydrology data set was selected based on the best available flow records at the Owen Falls site, namely the 1961 to 1989 flow data set. The risk that the hydrology could revert to a condition described by the pre-1960 data is estimated by the consultants to be less than 1%.”

Frank Muramuzi of NAPE states, “It is clear that the Bank and Acres were excessively optimistic in their appraisal of this project, and that its risks were greatly underestimated. Uganda is now paying the price, and

is saddled with an expensive white elephant of a dam that not only cannot produce the power that it promised, but is doing serious harm to Lake Victoria.”

NAPE has long pressed for development of energy sources other than more hydro-power dams for Uganda, arguing that the nation’s almost total dependence on hydropower in a time of climate change is unwise. The group intends to hold a public meeting with hydrological experts from the region to discuss the issue and ways forward.

The World Bank has also been a major proponent of the proposed Bujagali Dam, and is at this time considering involvement in the project under a new developer. ■

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comes from (they do not). In fact, he explains, it takes six tons of coal a year to power the average house in the US southeast – 30% more than the national average.

By the end of the film, Barrie has become a crusader, determined to lighten the region’s deadly black habit, house by house. He begins with his own house. In a sweetly playful segment, we watch as he and his wife Heather change out regular light bulbs for compact fluorescents; and replace an old refrigerator with a more efficient model. The film also visits families whose houses are producing more energy than they use, companies that are saving hundreds of thousands of dollars in energy

bills thanks to conservation efforts, a wind farm and a solar-energy lab, and other hopeful places. Barrie’s enthusiasm for saving energy is infectious – and what a good thing to catch. This reviewer immediately looked into improving the insulation in her own house after watching the film.

Barrie’s new organization, the Southern Energy Conservation Initiative, is taking the film and its message of hope across the Eastern US, and signing up homeowners to join the crusade to reduce their energy use. The film deserves wider coverage than just the eastern US, however, and is available for house-party showings (send an email via the website).

For another independent filmmaker’s look at a pressing energy issue, IRN’s own Terri Hathaway produced a 28-minute film on the controversial World Bank-funded Chad-Cameroon pipeline in 2003. You can order copies of “Pipe Dreams: People of the Cameroon Pipeline” from Terri (terri@irn.org). The film is also available from The Film Connection (www.filmconnection.org/), an internet-based public lending library of films for US residents.

“Our Land is Not for Sale!”

by Monti Aguirre

Communities who would be impacted by the proposed La Parota Dam on the Papagayo River in the State of Guerrero, Mexico have met political persecution of their leaders and police violence because of their opposition to the construction of the dam. Two community leaders have been murdered – Tomas Cruz Zamora was killed last September as he returned from an organizing meeting, and Eduardo Maya Manrique was stoned to death this January. In recent months, police have attacked peaceful community demonstrators, wounding hundreds of farmers.

One reason for these serious human rights violations is that the Mexican government wants to start construction of the hydroelectric dam this year, and is trying to rush through project approval without following the proper procedures. If built, the project would displace 25,000 people and affect the lives of 75,000 more who currently depend on the Papagayo River for fish, transportation, agriculture, water and other necessities. Yet many of these people have not been given an opportunity to participate in com-

munity forums to discuss the project. Those consultations which have taken place were with communities who will not be affected by the project, and were marked by massive police presence which hindered participation by most of the affected communities.

Affected communities have created the Council of Communities Against La Parota Dam (CECOP) to fight against construction of the dam and for their rights. With the Mexican Movement of Dam-Affected People (MAPDER), they have held numerous protests and other activities to register their opposition to the dam. Some members of CECOP were already affected by the construction of La Venta Dam located upstream from the proposed site for La Parota.

“The dam will flood forests and dry up aquifers,” said Marco Antonio Suastegui of CECOP. “Our land is not for sale!”

The 900 MW dam would be built in a rural area near Acapulco City, less than 50 kilometers from Acapulco Airport, and would flood nearly 17,000 hectares of land. The project is estimated to cost more than US\$1 billion. Construction companies from

several countries have shown an interest in the project, including Mexican construction company ICA, which is owned by Carlos Slim, ranked the world’s fourth-richest man by *Forbes* magazine. The Mexican government hopes to commence construction by July 2006, but whether they can obtain the necessary approvals and financing by then remains to be seen. ■

What is IRN Doing?

IRN is working with local NGOs in helping to call attention to human rights violations associated with this project.

Take Action

Send a message to Vicente Fox, President of Mexico, asking that he cancel the project, stop repression of project opponents and investigate better alternatives for meeting Mexico’s energy needs.

You can send a letter from IRN’s Take Action web page: <http://www.irn.org/action/060223laparota.php>

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