



China Dams the World

Peter Bosshard

On July 14, 2002, I almost got kicked out of Naminya village, a resettlement colony for several hundred refugees displaced by the Bujagali Dam in Uganda. The village lies near Lake Victoria on a barren hill overlooking the Nile. The villagers mistook me for a manager of the dam builder, AES Nile Power, with whom they had a few scores to settle. Their new plots were less fertile than the lands they had given up, dam construction prevented them from fishing in the Nile, and they had to walk for miles to find firewood and sell their produce on the markets. Their tempers flared and fists were clenched until they realized that I only happened to share my first name with the project manager. “We often sleep with empty stomachs,” the villagers told me once the dust had settled.

A few weeks after my visit, the Bujagali project collapsed in a corruption scandal. The main civil engineering contractor, Norway’s Veidekke Group, admitted to bribing the former Ugandan energy minister, who had meanwhile joined the board of the World Bank. The Bank suspended its funding for the Bujagali Dam. The private developer withdrew, and the project remained in limbo for several years. The government insisted the dam would still be built, but in the meantime, displaced

villagers had to fend for themselves in resolving their problems.

Hydropower dams generate about one-fifth of the world’s electricity, and low-carbon electricity sources are in high demand in an age of climate change. Yet at the time of my visit to Naminya, dam building looked like a sunset industry. Conflicts over large dams on the Yangtze River, in India’s Narmada Valley, in Southeast Anatolia, and in the Mekong Basin had paralyzed governments and financial institutions throughout the 1990s. The independent World Commission on Dams found that most projects did not live up to their expectations in terms of power generation, irrigation, and flood control, and often had unacceptable social and environmental costs. Dams have displaced 40–80 million people, and impoverished most of them in the process. Leading companies such as ABB and Sulzer withdrew from the sector, and the World Bank sharply reduced its lending for dams. “Big dams account for 10 percent of our portfolio but 95 percent of our headaches,” John Briscoe, the World Bank’s senior water advisor, confessed in 2003.

The Merowe Dam in Northern Sudan illustrates the changing fate of the dam industry. Starting in the 1970s, a string of Western engineering companies had pro-

posed to build a hydropower project on the Nile's Fourth Cataract. In the late 1990s, Sudanese government delegations visited Canada, Malaysia, Europe, and several Arab countries in the search for funding, but returned mostly empty-handed. Arab governments offered to pitch in some financial support, but could not provide the technology required for the dam. European export credit agencies pointed out that the project did not have an environmental impact assessment. Tens of thousands of farmers would need to be displaced from the fertile Nile Valley to arid desert locations, and Sudan's human rights record in infrastructure projects did not inspire confidence. The French government, for example, refused funding for a contract in the project because of human rights concerns.

In the early days of the new century, the Merowe Dam project appeared to be dead in the water. Similar projects in other countries had proved too much of a headache for the industry's main funders. Just then, a seismic shift occurred in the global dam sector. The epicenter was to be found in China.

Turning the Tables

Today, roughly half of all the world's large dams are within China's borders. With a capacity of more than 170,000 megawatts, it is the world's largest producer of hydropower. Ever since Siemens installed the first turbines on a river in Yunnan Province under the Qing Dynasty in 1909, Western companies had provided the technology for the bulk of China's hydropower dams. When the Chinese government decided to build the giant Three Gorges and Ertan dams in the early 1990s, it still had to turn to Western equipment suppliers. Yet this time, it proposed new rules of the game. Companies interested in the multi-billion dollar contracts had to manufacture half of the turbines and generators on Chinese soil, in cooperation with Chinese partners. The

leading hydropower companies of the time—including ABB, Alstom, General Electric, and Siemens—duly complied. They entered joint ventures with Chinese suppliers and transferred their technology in the process.

As in a host of other manufacturing sectors, the Chinese pupils wasted no time copying, underpricing, and outpacing their Western masters. Chinese manufacturers had gained international experience equipping small dams in countries such as Albania, Algeria, Burma, and Nepal for several decades. Around 2003, they entered the exclusive market for large hydropower projects. At the forefront were three companies which had picked up the latest Western technology in the Ertan and Three Gorges projects: Dongfang Electrical Machinery and Harbin Power Equipment, two sprawling state-owned conglomerates from China's heavily industrialized northeast, and Beijing-based Sinohydro, China's leading hydropower contractor. In a now familiar approach, the Chinese companies employed vast economies of scale and adapted Western technology to poor-country needs by streamlining production processes—at a substantially lower price. In short, in the early years of the twenty-first century, Chinese dam builders began to beat the West at its own game.

China's hydropower companies ventured into foreign markets on their own volition. The profit margins in their home market are notoriously slim and the potential for further growth is limited. Once the companies acquired the latest hydropower technology, they were eager to compete for contracts in more profitable overseas markets. The international expansion of Chinese dam builders coincided with an economic “going-out” strategy that the government started promoting around the turn of the twenty-first century. In China, approximately one-fifth of humanity lives on only 7 per-

cent of the world's cultivable land. The country has become "the world's factory" and needs vast amounts of resources to manufacture the clothes, television sets, and sofas that fill the living rooms of the world's middle class.

China does not have sufficient reserves of oil, timber, or mineral resources to sustain its rapid domestic growth and its global role. Thus, China has turned to foreign trade and investment to help secure the resources it lacks at home. Its worldwide economic expansion also helps to stave off a looming unemployment crisis in a country where the modernization of agriculture unleashes millions of rural job-seekers into urban cen-

ters every year. As part of China's "going-out" strategy, trade with Africa, for example, has increased roughly 20-fold in the last ten years.

But though the globalization of China's hydropower industry is not part of a grand design, it has been eagerly embraced by the government in Beijing. Overseas dam projects create jobs in China's northeastern rust-belt. Moreover, in countries such as Burma, the Democratic Republic of Congo, Gabon, and Zambia, they also provide the energy infrastructure for larger resource extraction projects, which again serve China's strategic interests. And finally, much like the sports stadiums that Beijing built around the world as goodwill gestures in earlier decades, dams have become the highly visible symbols of burgeoning economic cooperation between China and the developing

world—at a time when Western governments are going soft on risky infrastructure projects.

The export credit agency China Exim Bank is a key tool through which the



For the Merowe Dam, Sudan turns to China.

Chinese government supports the global expansion of its infrastructure companies. The Bank, which specializes in large projects of state-owned companies, has offered generous loans, often at reduced interest rates, to facilitate the construction of overseas dams. China Exim Bank was only created in 1994, some 60 years after its Western competitors, but its portfolio has outgrown all other export credit agencies, including the World Bank. On December 23, 2003, China Exim Bank agreed to provide \$519 million in loans for the Merowe Project in Sudan. This was the breakthrough for the dam on the Nile's Fourth Cataract.

A View From the Ground

While a colleague and I were visiting Sudan in February 2005, President Omar al-Bashir announced that the Merowe Dam would

“represent the end of poverty in Sudan.” The hydropower project would more than double the country’s electricity generation, benefiting industry, urban consumers, and agriculture. The representatives of the dam authority admitted that the 174 kilometer-long reservoir created by the project would eventually displace more than 50,000 people from the Nile Valley. But, they offered, the resettlement colonies would have modern amenities such as schools and health centers, as well as access to irrigation water.

When we sat down with farmers over tea at the resettlement site of El Multaga on a hot afternoon, we heard a very different story. A village elder, who for his own protection we will call Osman, summarized the situation for us. The soil at their new home was so poor that they could only grow two to three bags of wheat per acre, rather than the 15 to 20 bags they had produced on the land surrounding their old village on the shore of the Nile. Worse, the barren soil required more labor to till and sow, and many families had pulled their boys out of school to help in the fields. Some of the plots the farmers showed us around El Multaga were covered with sand. “We were deceived,” Osman and his colleagues complained.

Women joined our conversation, with their own stories to tell. In their old homes in the Nile Valley, they grew beans, chickpeas, green vegetables, tomatoes, onions, cumin, eggplants, and dates for their own households and for sale at market. Now, the poor soil no longer supported vegetable gardens. The women had lost their own source of income, and their families’ nutrition had become less varied. Since 5,000 people were moved here at the end of 2003, poverty in El Multaga had grown rapidly. For the first time, families depended on handouts to survive, and many of them were leaving their new, unwanted home for the slums of Khartoum.

The tall farmers in their long, white *jellabas* and the women in their colorful dresses were clearly offended by their fate. “We have lived in the Nile Valley since time immemorial, and have enjoyed peace and prosperity,” Osman told us. “During all this time, the government has never done anything for us. Why are we being cheated now that it wants to bring development?”

Farmers who lived further upstream along the Nile Valley and were to be resettled later saw what happened to their brethren in El Multaga and heightened their resistance to being displaced from their lands. They proposed to settle along the banks of the narrow future reservoir, close to their ancestral lands, rather than in the arid sites in the Nubian Desert that the government had allocated to them. “If this project really benefits the nation, the government should honor our rights to just compensation and to resettlement sites that we choose,” one elder from the ethnic Manasir community told us. The Sudanese government would have none of it. Several times, the police and thugs broke up meetings, detained village leaders, and shot at protesters. In April 2006, militia of the Dam Implementation Unit—a ministerial-level body reporting directly to the president—attacked a gathering of villagers at a school in Amri village, to the west of El Multaga, killing three farmers and injuring more than 50 others. One of Osman’s colleagues in El Multaga had been shot in the arm in a separate incident. “We have lived on these lands for generations, but the dam authority treats us like enemies,” he told us with quiet bitterness.

Exporting China’s Experience

In December 2006, I was invited to discuss the problems of large dams with Li Ruogu, the president of China Exim Bank. Yes, the affable and cosmopolitan official told me, he had heard about the problems at Sudan’s

Merowe Dam. And yes, he assured me, financiers like China Exim Bank shared responsibility for the social and environmental impact of projects they took on. He vowed to send a team to Sudan to look into the issues. But, the head of the export credit agency told me, China had first to grow out of poverty before it could start worrying about the environment, and would not stand in the way of governments of other developing nations which did the same. Like other countries, Li seemed to say, China was just exporting its own experience when it funded projects abroad.

While the Merowe Dam was taking shape on the Nile's Fourth Cataract, Chinese dam builders were rapidly expanding their involvement in projects around the world. In quick succession, they undertook feasibility studies and signed contracts for projects in Burma, Cambodia, Ecuador, Ethiopia, Ghana, Laos, Malaysia, Mozambique, Nepal, Nigeria, Pakistan, Vietnam, and Zambia. Today, Chinese companies and financiers have become involved in at least 220 dams in 50 countries. They are currently building 19 of the world's 24 largest hydropower stations, and power generation equipment is now China's second-largest export earner after electrical appliances.

Faced with the success of Chinese dam builders on the world market, Western competitors, who transferred their technology to China only a decade ago, can be heard grumbling in the background. Karl Marx famously remarked that "the last capitalist we hang shall be the one who sold us the rope." In a modern variation of this theme, the last Western dam builder to drown in a reservoir may well be the one who sold China the turbines.

In March 2009, President al-Bashir inaugurated the Merowe Dam with much

pomp and ceremony. But while he celebrated the project as a "great milestone of Sudan's development," the problems remain unresolved. As the dam gates closed, flooding the upstream reservoir, the people who had refused to leave their lands were forced to flee their homes like rats. Thousands of families who decided to cling to their

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flooded lands are still trying to eke out a desperate living in temporary shelters on the banks of the reservoir.

For those who were resettled to El Multaga, things have not turned out much better. An analyst team from the Ministry of Agriculture visited the resettlement areas in April and May and reported on the "devastating deterioration" of living conditions. Harvests had failed due to sand encroachment and a lack of water and fuel, and many families were fleeing the resettlement sites in the Nubian Desert in hopes of finding homes elsewhere.

The Merowe Dam, however, is not representative of all hydropower projects. Electricity creates manufacturing jobs, powers water supply systems, runs health centers, and lights up households. Dams that protect the rights of affected people and the environment have made an important contribution to social and economic development in Canada, Norway, South Africa, and many other countries. Yet the dam on the Nile is not an isolated case either. The new glut of hydropower funding allows many projects to go forward that don't meet international social and environmental standards. And China accounts for a fair share of questionable projects.

In July, a Chinese dam builder signed a memorandum of understanding with the Ethiopian government to build the Gibe 4 Dam on the Omo River. The Lower Omo River sustains 200,000 poor farmers who cultivate its banks after the annual floods, and another 300,000 people who live along Lake Turkana in Northern Kenya, the world's largest desert lake. The Gibe 4 and other dams on the Omo River will seriously curtail the annual floods and the water supply to Lake Turkana. Scientists working in the region are concerned that they will push the fragile ecosystems of the Lower Omo Valley and Lake Turkana to the brink of collapse.

Chinese dam builders are also preparing feasibility studies for major dams on the Mekong River in Laos and Cambodia. The Mekong, which has so far not been dammed south of the Chinese border, supports the planet's richest inland fisheries. Fish are a vital part of the region's biodiversity and contribute to the food security of 60 million people. Damming the Mekong would block fish migration, degrade agriculture on its fertile floodplains, and destroy priceless ecosystems.

In Myanmar, Chinese investors and equipment suppliers are involved in more than 20 major hydropower projects, many of which are located in the remote territories of ethnic minorities. The government does not require environmental impact assessments for large dams, and is riding roughshod over the human rights of affected communities. Civil society groups have documented that dams in Myanmar are often built under military occupation and with forced labor.

As the dam industry has come of age, China has become the dominant actor, but there are other emerging competitors in the international hydropower sector. Companies from several other countries are also leaving their home markets to push the global boundaries of hydropower development.

Indian companies are building dams in Nepal, Bhutan, Myanmar, and Vietnam. Brazilian companies are doing the same in Latin America and Africa. Thai, Malaysian, and Vietnamese companies have proposed building dams throughout the Mekong Basin. Russian, Iranian, and Korean suppliers have also joined the global hydropower club. Much like Chinese investors, they don't always follow accepted international social and environmental standards in their projects. Yet Chinese companies and financiers play the lead role—and thus must take a fair share of the blame. Without their funding and technology, many projects in countries such as Burma, Laos, and Sudan would not go forward.

Shared Headache

In October 2008, China completed construction on the Three Gorges project ahead of schedule. Each year, the dam will generate power equivalent to the burning of more than 30 million tons of coal and, authorities hope, protect downstream populations from the Yangtze River's devastating floods. China's hydropower industry is celebrating the Three Gorges as a big success. In recent years, high-level delegations from Congo, Nepal, Pakistan, South Africa, and other countries were invited to visit the dam, which has become a showcase for China's engineering prowess.

The inhabitants of Yunyang, a city of 74,000 people that was flooded and rebuilt higher up the banks of the reservoir, do not share the exuberance. When the Three Gorges project was launched, the government promised that it would provide land to the farmers and create jobs for the urban population who had to make way for the dam. Yet after ten years of economic reform, the Chinese government is no longer in the business of creating jobs. Only 45 of Yunyang's 181 factories were moved to higher ground, and 20 of the relocated factories

have since closed down. Local officials diverted compensation funds into their own pockets, and what remained was not enough to pay for the new homes for resettled families. In the end, many families had to spend their savings on new apartments, and faced a bleak future when they lost their jobs. The benefits of the Three Gorges Dam failed to reach Yunyang.

Environmental experts also have reason to be concerned. Turning the mighty Yangtze into a stagnant body of water has decimated fish species and created frequent toxic algae blooms, which affect aquatic wildlife and make the water undrinkable. The operation of the dam for power generation and flood protection causes the reservoir level to fluctuate by 100 feet every year. The fluctuations have destabilized the slopes and caused hundreds of landslides. Earlier this year, more than 100 miles of reservoir banks were on the brink of collapsing. “The problems are all more serious than we expected,” the secretary general of the Yangtze River Forum admitted in August 2007.

All around the country, promoting economic growth at the cost of the environment is exacting a huge toll on public health. The World Bank estimates that water and air pollution cause 750,000 premature deaths in China every year. The government is aware of the toll that pollution is taking on China’s society and economy, and it is attempting to clean up rivers, reduce carbon emissions, and promote a green economy. Officials in Beijing have allowed the rapid growth of environmental non-governmental organizations (so long as protests are kept within limits), strengthened environmental regulations, and created a Ministry of Environmental Protection in

2008. The ministry has repeatedly blocked polluting companies from receiving bank loans and from listing on the stock exchanges of Shanghai and Shenzhen—an authority that exceeds that of any Western environmental ministry. China has also become the leading producer of wind mills and solar panels, thus commandeering the energy markets of the future.

From Yunyang to Beijing, the headaches associated with large dams have caught up with decision-makers. The current government appears to be less enthusiastic about building dams than its predecessors. Nei-

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ther President Hu Jintao nor Prime Minister Wen Jiabao attended the inauguration of the Three Gorges Dam. And at several instances, Prime Minister Wen personally intervened to suspend destructive hydro-power projects on the Nu River in Yunnan Province. Domestically, China is becoming more environmentally conscious, but will this awakening affect its dam-building efforts abroad anytime soon?

A Wake-up Call

Chinese investment in the developing world has many faces. Chinese companies are building much-needed hospitals, railways, and roads. But they have also used ruthless tactics as they drill for oil and gas, prospect for minerals, and cut down forests. A few years after being welcomed as an alternative to exploitive Western investors, Chinese mining, logging, and construction companies are facing a backlash in many countries. In Zambia, for instance, the death of several

local workers in an accident at a Chinese explosives factory in 2006 led to riots in which more employees were killed. The role of Chinese companies even became a heated topic in Zambia's presidential election. When President Hu visited Zambia in February 2007, his hosts advised him that it would not be safe to visit the country's copper belt. In Ethiopia, Kenya, and Nigeria, Chinese oil installations and factories were attacked by protesters and militants enraged by a litany of grievances— withheld jobs, a lack of local contracts, destruction of natural resources, and support for local strongmen. In June 2007, affected villagers staged angry protests against the proposed Kajbar Dam in Sudan, which Chinese companies were planning to build downstream of the Merowe Dam. In one demonstration, four young protesters were killed by government militia. Chinese dam projects are also embroiled in labor and community struggles in Botswana, Ghana, Pakistan, and other countries.

The hostilities in Zambia and other places came as a shock to the Chinese government. Starting in 2006, government agencies issued a series of guidelines and recommendations to improve the working conditions, environmental performance, and community relations in Chinese overseas projects. The State Council called on Chinese investors to “protect the legitimate rights and interests of local employees, pay attention to environmental resource protection, care and support of the local community and preserve our good image and reputation.” In country after country, President Hu urged Chinese businesses to respect local laws when he visited Africa in early 2007. Beijing's environmental protection and commerce ministries are currently preparing guidelines requiring investors to apply Chinese domestic environmental laws to overseas projects if host country standards are too weak.

But, as the old Chinese saying goes, the mountains are high and the Emperor lives far away. Local officials and business people in remote provinces don't always follow the fiat from Beijing—even less when they invest in Burma, Zambia, or Sierra Leone. Although owned by the state, Chinese enterprises often operate at arm's length from the government and do not necessarily follow official policies when they contradict corporate interests.

But civil society groups on the international level, in China, and in host countries have begun to act as a check on the role of these companies. They have become more adept at monitoring the role of Chinese foreign investors, just as they have monitored Western corporations for many years. Since President Hu's 2007 trip, several delegations of Chinese non-governmental organizations have visited Africa to learn more about the impact of Chinese enterprises and to hear the concerns of their African peers. In May 2007, an activist from Sudan traveled to Beijing to present the problems of the Merowe Dam to the media. In response to his courageous effort, China's Foreign Ministry felt compelled to assure the public that the government had attached “great importance to the local people's livelihood” and applied “strict environmental evaluation standards” in projects like the Merowe Dam. In spring 2008, China Exim Bank suspended a planned loan for the Belinga Dam in Gabon after a local environmental group informed it that the dam was due to be built in a national park without a public environmental impact assessment.

An Environmental Race to the Bottom?
Western dam builders and financiers have not remained silent bystanders as their Chinese competitors conquered the world market. They once again have stepped into the fray, wielding concerns over China's domination of the hydropower sector as a

second lease on life. If the construction of large dams has caused headaches for the World Bank, they argue, they will leave an even bigger hangover if funded and built by China. The World Bank has reversed its earlier caution and begun to embrace dams again. Since 2003, it has approved about \$4 billion in support of mostly medium-sized hydropower projects. Even if Western funders have so far stayed away from the most destructive projects, the competition between Western and Chinese dam builders risks further undermining environmental standards across the board.

In the case of such controversial projects as the Nam Theun 2 Dam on a tributary of the Mekong in Laos and the Ilisu Dam on the Tigris in Turkey, European dam builders and financiers have played the Chinese card to argue against stringent social and environmental guidelines. If Western institutions are too strict in the standards they apply, they maintain, they will lose business to Chinese competitors, who may care even less about the environmental impact of such projects. “Chinese banks don’t bother about social or human rights conditions,” the president of the European Investment Bank remarked in November 2006, noting that his bank had to “think about the degree of conditions we want to impose.”

In April 2007, five years after my visit, the World Bank approved \$360 million in support for the Bujagali Dam in Uganda, the project it had dropped in 2002. Under the new terms, the Naminya resettlement colony received a health post and a nursery school. Yet the villagers still complain that

without access to the Nile and nearby markets, they are poorer than they were before displacement. Soon, the project developer will displace more people to Naminya to make space for the dam’s transmission lines. As is so often the case, it is the impover-

“In controversial projects, dam builders have used the Chinese card to argue against stringent social and environmental guidelines.”

ished, disenfranchised people in countries such as Uganda who will pay the price if social and environmental standards are lowered in response to China’s emerging role as a global dam builder.

So what is to be done? Competing for international contracts by lowering social and environmental standards would lead to more boondoggles in the mold of the Merowe and Three Gorges dams. Recent experience confirms that even though China and the West have different political systems and cultures, they share a basic concern for social and environmental values. Governments from around the world have signed on to a shared set of international environmental conventions. While they grapple with how to uphold their commitments, they are all increasingly being held to account by their populations and a growing international civil society network. Working together with Beijing and host country governments to strengthen environmental standards in global projects looks like a more promising approach than engaging in an environmental race to the bottom. ●