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Chinese Dam Projects Criticized for Their Human Costs

By [JIM YARDLEY](#)

JIANMIN VILLAGE, China — Last year, Chinese officials celebrated the completion of the Three Gorges Dam by releasing a list of 10 world records. As in: The Three Gorges is the world's biggest dam, biggest power plant and biggest consumer of dirt, stone, concrete and steel. Ever. Even the project's official tally of 1.13 million displaced people made the list as record No. 10.

Today, the Communist Party is hoping the dam does not become China's biggest folly. In recent weeks, Chinese officials have admitted that the dam was spawning environmental problems like water pollution and landslides that could become severe. Equally startling, officials want to begin a new relocation program that would be bigger than the first.

The rising controversy makes it easy to overlook what could have been listed as world record No. 11: The Three Gorges Dam is the world's biggest man-made producer of electricity from renewable energy. Hydropower, in fact, is the centerpiece of one of China's most praised green initiatives, a plan to rapidly expand renewable energy by 2020.

The Three Gorges Dam, then, lies at the uncomfortable center of China's energy conundrum: The nation's roaring economy is addicted to dirty, coal-fired power plants that pollute the air and belch greenhouse gas emissions that contribute to [global warming](#). Dams are much cleaner producers of electricity, but they have displaced millions of people in China and carved a stark environmental legacy on the landscape.

"It's really kind of a no-win situation," said Jonathan Sinton, China program manager at the International Energy Agency. "There are no ideal choices."

For now, China's choice is to keep building big dams, even as the social and environmental impacts of the projects are increasingly questioned. The Three Gorges Dam is projected as an anchor in a string of hydropower "mega-bases" planned for the middle and upper reaches of the Yangtze River. By 2020, China wants to nearly triple its hydropower capacity, to 300 gigawatts.

The Communist Party leaders who broke ground on the Three Gorges project in 1994 had promised that China could build the world's biggest dam, manage the world's biggest human resettlement and also protect the environment. Critics warned of potential dangers, but saw those objections pushed aside. Now, critics say, the problems at the Three Gorges underscore the risks of the new phase of dam building, which could displace more than 300,000 people.

"In western China, the one-sided pursuit of economic benefits from hydropower has come at the expense

of relocated people, the environment and the land and its cultural heritage,” Fan Xiao, a Sichuan Province geologist and a critic of the Three Gorges project, said via e-mail. “Hydropower development is disorderly and uncontrolled, and it has reached a crazy scale.”

Advocates say hydropower is one of China’s richest and least tapped energy resources. Even though much of the country is plagued with drought and water shortages, China also boasts a knot of important rivers that flow out of the Tibetan high plateau. Currently, China uses only about one-fourth of its hydropower potential.

A Hunger for Energy

At the same time, China’s insatiable appetite for energy is mostly being met with a building spree of coal-fired power plants. Coal accounts for 67 percent of China’s energy supply. Just last year, China added 102 gigawatts of generating capacity, as much as the entire capacity of France.

To ease its addiction to coal, China wants 15 percent of the country’s energy consumption to come from renewable sources by 2020, compared with 7.5 percent today. To do that, it is developing solar, wind and biomass projects so rapidly that some experts say it could soon become a world leader in renewable energy. Even so, forecasts show these sources will amount to less than 4 percent of the energy supply by 2020.

Nuclear power is another popular alternative, and officials plan to double its capacity by 2020. Yet even such a huge expansion will only amount to 4 percent of the energy supply.

Hydropower, by contrast, already accounts for 6 percent of the power supply and has major growth potential. Chen Deming, one of the government’s top economic planners, said hydropower was a critical noncarbon energy source and described the negative impacts of dams as “controllable.” He said officials would emphasize environmental protection and resettlement issues on future projects.

“We believe that large-scale hydropower plants contribute a lot to reduce energy consumption, air and environmental pollution,” Mr. Chen said at a September news conference. China, he added, planned to develop hydropower on “a considerable scale.”

Internationally, a debate has raged for years about large dams (those higher than 50 feet) because of their legacy of disruption. Many environmentalists contend that electricity generated by large dams should not be considered renewable because of the social and environmental damage that follow many projects. The United States has many large dams, but in recent years has started decommissioning some of them, particularly in the West, because of environmental concerns.

Tension about large dams is also rising in China. Environmentalists are pushing for tighter regulation and more public input before projects are approved. Resettlement remains a volatile issue. Two years ago, more than 100,000 people protested the Pubugou Dam project in Sichuan Province, until the riot police crushed the demonstration.

President [Hu Jintao](#) and Prime Minister [Wen Jiabao](#) appear less enamored of the big projects than their predecessors. Neither man attended last year's ceremony for the completion of the Three Gorges Dam. Mr. Wen has demanded environmental reviews for different proposed sites. Yet with the momentum of the surging economy, most projects continue moving forward.

The renewed debate about the Three Gorges project offers a view of the competing pressures on China. Equal parts vanity project and technological marvel, the Three Gorges was initially conceived for flood control, not for any efforts to promote clean energy.

Today, dams are big business in China, and profit-seeking is another major reason behind the hydropower push.

Few if any hydropower projects have been more controversial than the Three Gorges. Entire cities were inundated along with ancient temples and other landmarks. Today, many of the people resettled by the project are still struggling to survive. For years, despite the problems, Chinese officials rarely criticized the project or expressed concern.

And then, unexpectedly, the silence broke.

'Hidden Dangers'

At a forum on Sept. 25 in the city of Wuhan, a group of officials and experts gathered for a discussion about the Three Gorges Dam that would ripple across China and beyond. A keynote speaker at the forum was Wang Xiaofeng, a point person on the project for China's State Council, the highest executive body in the government.

Mr. Wang began by reciting different accomplishments and reminding his audience that China had overcome widespread skepticism to prove it could build the project. But with the construction of the hydropower station entering its final phase, "environmental security" represented the new challenge, he said. According to a transcript of his speech, Mr. Wang warned that "hidden dangers," if left untended, could breed disaster. He said that increased pressures on the shoreline "may become causes for water pollution, landslides and other geological disasters."

Water quality in the main reservoir remained stable, but Mr. Wang said pollution was worsening in tributaries because of high levels of nitrates and phosphates that had already endangered drinking water in some areas. He said an algal bloom from too many nutrients earlier this year on a tributary had contaminated drinking water for 50,000 people in Fengdu County.

Mr. Wang framed his speech like a call to action. He said officials needed to address environmental problems "at the root." He warned that government agencies were not prepared for emergencies and had no plan for natural disasters like an earthquake. He declared that China would now "work hard to build a first-class hydropower project and to create a first-class environment."

“The environmental work of the Three Gorges Dam will be a long and hard road,” he cautioned.

Critics Are Astonished

The next day, Xinhua, the government’s news agency, carried a few comments from Mr. Wang and other regional officials in an article that ran beneath a blaring headline on the agency’s English-language Web site: “China Warns of Environmental ‘Catastrophe’ From Three Gorges Dam.”

Longtime critics of the project felt vindicated, if astonished, at the official concession. “In more than 20 years that have passed, the dam authority and official Chinese media have been reluctant to utter one word about problems with the big dam project,” Dai Qing, a prominent dam critic, wrote on the Web site of Probe International, an environmental group.

“Instead, they have tried to cover up, make false reports and deceive ordinary Chinese people,” she wrote.

In Beijing, some observers wondered if Mr. Hu and Mr. Wen had allowed the public airing in order to distance themselves from a project built by earlier leaders. Others speculated that officials in the reservoir region were publicizing the problems because the last construction phase ends in 2009. New problems could mean new streams of government financing.

Most of all, though, the mere suggestion of a “catastrophe” raised an alarming question: What constitutes a catastrophe at the world’s largest dam?

Mr. Fan, the geologist and critic, said the Three Gorges region had a history of geological fragility. He said the worst situation would be a major earthquake induced by pressure from the rising water — a possibility that officials have long discounted. Heavy silt accumulation, if seemingly less alarming, could also pose severe problems upstream as it gradually builds up the floor of the reservoir.

Silt accumulation has steadily reduced the capacity of other Chinese dams to store water, which has also reduced electrical generation. Planners of the Three Gorges Dam estimated that sedimentation could become a problem upstream in the city of Chongqing within 20 years.

But Mr. Fan and other scientists say sedimentation is already happening at a rate that could create flooding and shipping problems in Chongqing much sooner than expected.

Proponents of the dam have quickly defended the project on the Internet and in Chinese publications. Xinhua, the official news agency that helped fuel the debate, has since taken a more measured tone. Zhang Boting, an advocate for the hydropower industry, said environmental issues were initially exaggerated in the news media. He said national statistics showed that overall water quality was improving and contended that his own research found that the number of landslides had declined since dam construction began.

“There is no hard evidence to show there is dramatic change,” said Mr. Zhang, who is vice secretary general of the China Hydropower Engineering Society, an industry trade group. “We have problems, but

we predicted those problems a long time ago. We are tackling those problems.”

Mr. Zhang said the situation was really about local bureaucracies facing the end of the project and looking for more financing. “Electricity is such a lucrative industry,” Mr. Zhang said. “The Three Gorges is like a piece of fat. Everybody wants to have a bite.”

Big Dams and Big Money

China once was so poor it struggled to build big projects. Today, dams are a huge business in China, and the giant utilities that build them are soaked with government and private investment money. When the corporation building the Three Gorges project publicly listed a subsidiary in 2003, share prices surged by 45 percent as the company raised nearly \$1.2 billion in a single day.

In 2002, the country began to dismantle its inefficient electric power monopoly. Five power giants were created and encouraged to exploit energy resources at a time when China was encountering sporadic regional blackouts. Competitive pressures drove each utility to pursue as many energy projects as possible to secure market share.

Today, the Three Gorges Dam is the de facto anchor of a planned system of 12 hydropower mega-bases on the middle and upper reaches of the Yangtze. Over all, officials have said more than 100 hydropower stations could be built on the upper Yangtze basin within two decades. The government-owned corporation that built the Three Gorges Dam has already started construction on 3 of the 12 large projects.

One of those sites, Xiluodu, will be the country’s second-largest hydropower station when it is completed in 2015. Two years ago, regulators halted construction at Xiluodu because the project lacked a proper environmental impact study. But work has quietly resumed. In November, crews succeeded in damming the Jinsha River, the tributary that forms the upper reaches of the Yangtze.

Environmentalists worry that these systems create a domino effect in which one mega-dam begets another.

New laws require dam projects to undergo environmental impact studies and also provide opportunities for public comment and oversight. But those laws are easy to circumvent, or ignore. Xiluodu, for example, is being built in a national protection zone for several species of endangered fish.

“These large dams will have a lot of impacts, sometimes irreversible,” said Ma Jun, an environmentalist and the author of “China’s Water Crisis.” “We have to look at them very carefully and follow our legal requirements very strictly.”

Richard Taylor, executive director of the International Hydropower Association, predicted that the pace of construction would slow down as China began to pay more attention to strategic planning for social and environmental issues. “There are some key players in China who want to be part of that more progressive approach,” he said.

Dam opponents have scored a handful of victories. In 2004, Mr. Wen, the prime minister, unexpectedly suspended plans for 13 dams along the Nu River. The Nu passes through a [Unesco](#) World Heritage site and is one of the last free-flowing rivers in Asia. In Sichuan Province, a large dam that would have inundated a Qin Dynasty waterworks was canceled after opponents framed the project as an attack on China's cultural heritage.

But opposition is still often steamrolled. The 100,000 protesters at Pubugou dam created a crisis that reached the desk of Mr. Wen. Ultimately, farmers saw little improvement in the compensation package. Last year, the authorities executed a leader of the protests for what they said was his role in the death of a policeman. Now the dam is moving forward.

And so are others. The Xiluodu Dam will force the relocation of more than 100,000 people in the city of Zhaotong. City officials are concerned. A report written by Chinese scientists and Zhaotong officials bluntly addressed the potential problems.

“Past experience has also taught that hydropower development will not necessarily improve local social and economic conditions,” the authors wrote. “There is widespread concern that, although the hydropower stations are as modern as those in Europe, the residents will become as poor as people in Africa.”

For the past decade, the only two directions for people in the Three Gorges region have been up or out. Large, white markers etched with the number “175” are placed on many hillsides. No other explanation is needed; everything below has already been inundated or will be when the reservoir reaches 175 meters, or about 574 feet, in 2009.

The Displaced

In his 2007 work report to the National People's Congress, Prime Minister Wen noted that dam building, over many years, has displaced 23 million people in China. The Three Gorges was supposed to be a model program that would not just move people but also rebuild communities.

Resettlement began in 1997 as an upward migration. Farmers could relocate to newly built cities or stay on the farm, albeit on higher ground. But studies now show the region's population density is almost twice the national average. In many villages, too many farmers are perched on steep slopes, sharing too little land.

The upward migration also damaged the environment. Farmers cleared land to plant crops or rows of orange trees. Deforestation contributed to soil erosion and destabilized many hillsides. Today, construction crews are busy reinforcing crumbling hillsides above the reservoir with concrete. In the mountains, soil erosion is endemic. In the village of Pinggao, Li Shuyi, 50, walked down the sloped fields, pointing out cracks in the earth.

“Whenever it rains, the soil starts flooding downhill,” Mr. Li said. “The problem is getting more and more serious in recent years.”

This summer, a tremor shook Pinggao like jelly, leaving cracks in several farmhouses. When rainfall is heavy, Mr. Li said his house swayed so much “you can hear the tiles cracking on the roof.”

He said, “Villagers are getting very worried.”

Problems have been evident for several years. As far back as 2000, the central government had already started changing national policies to address environmental decay. The clue had been the horrific floods along the Yangtze, which claimed thousands of lives in 1998. Deforestation and soil erosion along the upper reaches of the Yangtze had abetted the disaster; silted riverbeds became elevated highways for the raging currents.

Beijing ordered a national ban on timber cutting and began reforesting millions of acres along the Yangtze, including in the Three Gorges region. Many farmers who had moved uphill now were told to plant a stabilizing green belt along the shoreline. To further ease pressure on the land, Three Gorges officials changed the relocation policy, promising free land and financial help for people who moved to other provinces.

Thousands Return

But leaving the region was not a good solution for many farmers — or a permanent one. More than 100,000 people left, but thousands have since returned, despite no longer holding local residency permits. In 2002, a group of 57 villagers left the village of Daqiao above the Yangtze for a village in Jiangxi Province. Today, all 57 have returned.

“We tried to grow rice in Jiangxi,” said Lin Shengping, 51, whose adult children had stayed in Daqiao. “The harvest was really small. So we all came back. We don’t have money, either in Jiangxi or here. But at home, I can take care of my grandchildren so my son and daughter-in-law can go out to work.”

Now, though, officials want people to move again. On Oct. 12, the Xinhua news agency confirmed that a new resettlement plan had been approved: At least four million people in Chongqing Municipality would have to be moved by 2020, including at least two million living in the reservoir region.

Chongqing officials quickly tried to deflect any suggestion that the plan represented another dam resettlement. Instead, they said, it represented a national experiment approved by Beijing in June. Chongqing would become a “pilot reform city.” Just as Beijing used “special economic zones” like Shenzhen to kick-start the country’s economic reforms during the 1980s, Chongqing would become a laboratory for trying to eliminate the urban-rural income gap.

“We’re talking about separate issues,” said Lang Cheng, director of Chongqing’s [Immigration](#) Bureau, which helped oversee the dam resettlement plan. “One is the Three Gorges relocation. One is the city plan for Chongqing for the future.”

For Chongqing officials, the emphasis was on urbanization. Rural residents would have the choice to move

to the outskirts of the city. Officials said the plan would offer enticements not available to migrants in the more prosperous coast, like residency permits enabling new arrivals to qualify for social welfare benefits.

But officials also said they hoped the plan would provide relief for the degraded land around the reservoir. “These relocated people sacrificed a lot for the Three Gorges Dam and their living standard dropped,” said Xu Yuming, a researcher involved in planning the program. “Now we are facing a new challenge of how to improve their living standards. The quality of land is getting worse and worse the higher they go. And there are now more people than the land can sustain.”

In the isolated mountain villages above the reservoir, farmers have heard nothing about a new resettlement plan. For many farmers, the immediate concern is the land beneath their feet. Landslides are striking different hillsides as the rising water places more pressure on the shoreline, local officials say. In Fengjie County, officials have designated more than 800 disaster-prone areas. Since 2004, landslides have forced the relocation of more than 13,000 people in the county. Not too far from the dam itself, residents in the tiny village of Miaohe felt a major tremor in April beneath their farmhouses. Officials ordered them to relocate for three months into a mountain tunnel for lack of any other nighttime shelter. “It rained the whole month,” said Han Yun, 43, a woman working in the fields. “It leaked the whole time. During the night, while we were sleeping, trucks were passing through the other side of the tunnel. Every part of my bones was aching.”

Not Enough to Rebuild

Residents now are supposed to relocate to a new village site less than a mile away. But many people did not get enough compensation to pay for new housing. “We have three family members,” Ms. Han said. “We only have 10,000 yuan (about \$1,300). With such a small amount of money, I can’t even build a first floor.”

Farther upstream, people in Jianmin Village are in the same predicament.

Around daybreak on June 22, Lu Youbing awoke to the screams of her brother-in-law and the sickening sensation of the earth collapsing. Her mountain farmhouse in Jianmin Village buckled as a landslide swept it downhill. In all, 20 homes were demolished. Five months later, Ms. Lu is living in a tent, fending off rats and wondering where her family can go.

“We have nothing left,” she said. “Not a single thing.”

Winter is approaching, and she is trying to block out cold air — and rats — by pinning down the tent flaps with rocks. Villagers have been told that more landslides are possible. Ms. Lu lives with her second husband and their two children. They are too poor to buy an apartment in the city or to build a new home on higher ground. Local officials gave them the tent. Villagers have donated clothes.

The tents are pitched on the only available flat land — a terrace with a monument celebrating efforts by local officials to improve the environment.

“We don’t know about winter,” she said. “This is the only option we have. What else can we do?”

Zhang Jing contributed research.

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