Navigating Peace: Forging New Water Partnerships

U.S-China Water Conflict Resolution Water Working Group

By Jennifer Turner and Timothy Hildebrandt

In 2002, the Wilson Center's Environmental Change and Security Project received a grant from the Carnegie Corporation of New York to create three water working groups to promote policy research and the exchange of ideas in three areas: (1) balancing water as an economic and social good; (2) future of conflict and cooperation over scarce water resources, and (3) water conflict resolution in the United States and China. ECSP's China Environment Forum has been responsible for the third water working group. In November 2003 the U.S.-China Water Conflict Resolution Water Working Group traveled to China and met with a diverse collection water experts from the government, NGO, academic, and legal communities in Beijing. A summary of these meetings is presented below.

Flooding the Courts?
The Growing Role of Environmental Lawyers in Resolving Water Conflicts in China

Private law firms only emerged in the People's Republic of China in the 1980s as Deng Xiaoping's regime pushed for the creation of a strong legal system to support economic reforms and international investment. While corporate and contract law practices developed quickly, private lawyers specializing in environmental law have only recently emerged as pollution disputes have grown. In the working group's first meeting they met with two lawyers from the Beijing Zhongzi Law Office—**Sun Junbao** (vice director and partner) and **Xia Jun** (lawyer)—who outlined the growing environmental law profession and discussed new initiatives by China's nascent commercial law firms to promote the practice of environmental law, particularly the new phenomena of lawyers pulling together class action suits of pollution victims to press for compensation in courts.

Promoting Professional Environmental Lawyers

In 1999, the Zhongzi Law Office and the Beijing University Law Institute joined together to form the first Environmental Law Institute in China, which is jointly overseen by the State Environmental Protection Administration and the Ministry of Trade. In May 2001, the Environmental Law Institute filed a report suggesting that the Ministry of Justice fund an All China Lawyers Association Environmental and Natural Resources Committee. The report was approved and the committee received funding in October 2001. The committee members come from 11 provinces and are made up of: (1) environmental law specialists, (2) senior lawyers who previously specialized in corporate law and recently converted to environmental law, and (3) lawyers interested in environmental law. Since being created the committee has set up satellite offices in Beijing, Guanxi, and Chongqing. The mission of this committee is to:

1. Participate in the legislative process of the National People's Congress (NPC);
2. Provide environmental law information and advice to policymakers, corporations and individuals; and,
3. Cooperate with international organizations to gather and exchange information on environmental law—for example the committee assisted the American Bar Association in providing environmental training to lawyers and other stakeholders in five Chinese cities.

There has been growing interest among Chinese lawyers to participate in this Environmental Law Committee, for this area of law is seen as a new hot "market" for litigation. Notably, Chinese lawyers do not demand fees in the early stages of a case—however if they win they receive slightly less than 20 percent of the settlement (plus expenses), which is lower than their U.S. counterparts who usually earn closer to 30 percent of the settlement.

Private Class Action Cases

Mr. Xia Jun discussed a contentious inter-provincial water pollution conflict in Bohai Bay (Hebei province) in which the Zhongzi Law Office successfully helped a large number of pollution victims win compensation for damages. The problem began in October 2000 when seven paper mills and two machine plants discharged highly toxic industrial wastewater into a small Hebei river that flows into Bohai Bay. These wastewater emissions decimated shellfish farms 100 kilometers along the coast. The fishers initially tried to pursue mediation with the factories, but encountered many difficulties, so instead turned to suing the factories in the Tianjin Maritime Court in 2001.

After the Tianjin Maritime Court received an estimate of damages from the Ministry of Agriculture and heard initial arguments, the court deemed that the burden of proof was on the nine defendants. Some of the defendants argued their wastewater had met the state emission standards, which meant they should not be responsible for any damages. They also argued since many factories operate along the river, the plaintiffs could not prove the nine defendants were solely responsible for the pollution. The defendants also alleged that the victims were illegally raising fish, so they have no rights to demand compensation for an illegal operation. While some factories contended they had discontinued production during the pollution period, court investigations revealed that the local government issued fake documents trying to prove the factories were not in operation. In the end the court was not convinced by the defendants' arguments of innocence and thus ruled all nine were jointly liable to pay the victims 13 million Yuan.

When the defendants appealed to a higher Tianjin court it also supported the lower court's decision, but suggested that the one factory meeting national standards should pay a slightly lower penalty than the others. This was the first time a court ruled a factory emitting less than the national standards was still partially responsible for pollution. This case set an important precedent, which could help future water pollution victims press cases against groups of industries emitting below set standards.

As of December 2003, the Tianjin Maritime Court was still trying to enforce the ruling, ordering some factories to discontinue highly polluting production. The drop in production caused some factories to close or to be auctioned off, which has led some factory workers and managers to protest or withhold payment to the plaintiffs.[1]

Pondering Suits Against Government and Mediation Options

The existence of a lawsuit is often evidence that responsible government agencies are not doing their job of protecting water resources. However, local government agencies overseeing industry or water resources cannot be sued in China. Some Chinese scholars and legal experts have suggested citizens be permitted to bring suits against government agencies, but such a change will not come anytime soon. Notably, Chinese law not only protects governments from suits, but it also makes it very difficult for governments to sue companies. Local monitoring agencies can only issue fines to polluters if they exceed pollution standards. While upper-level governments sometimes close polluting plants in highly publicized cases these plants may quietly be reopened by local governments that are dependent on their tax revenues.

In China, most pollution control regulations stipulate that victims of pollution should first go to administrative agencies (often the local environmental protection bureau) and request mediation, although mediated settlements create only voluntary and not binding obligations.[2] While they are legally obligated to mediate, administrative agencies rarely are willing to do so due to pressures from the local government. Administrative agencies often avoid the obligation to mediate by asking the polluting factories if they want to move straight to litigation, which they usually do.[3] Some Chinese scholars suggest there should be an independent third-party arbitration organization in China for pollution and other civil disputes as there is for business disputes, but such an organization is unlikely to be created in the near future.

Chinese lawyers rarely participate in mediation because they do not earn fees as they do for litigation. Moreover, mediation cases do not usually provide large amounts of compensation to pollution victims. Sun Junbao noted one exception when several years ago the Ministry of Agriculture mediated a case and successfully enforced compensation of several hundred thousand Yuan to the pollution victims.

An NGO Empowering Pollution Victims

In 1998 **Wang Canfa**—a law professor at Beijing Politics and Law University—set up a unique NGO that aims to help empower pollution victims in the courts. Through a broad range of activities the Center for Legal Aid to Pollution Victims (CLAPV) aims to: (1) raise consciousness of environmental law and rights of the public, (2) improve the capacity of administrative

agencies and judicial bodies that preside over environmental conflicts, and (3) promote enforcement of Chinese pollution control laws. CLAPV has no full-time staff and instead depends on 95 volunteer members—ranging from law professors, teachers, graduate students and lawyers—to do research work, advise lawmakers, and help pollution victims.

CLAPV focused its initial efforts on providing information to pollution victims on their legal rights by opening a legal advisory hotline and offering periodic free consultation services on a busy Beijing shopping street. The center also tries to use the news media to increase the public's understanding of environmental laws and rights of pollution victims. One of the center's other main activities includes helping pollution victims file lawsuits. Since 1998 CLAPV has brought 51 cases to court with more wins than losses. While assisting individual victims is core to CLAPV's mission, since 2001 they have also held training sessions for 190 environmental lawyers and 90 judges to enhance their capacity to handle environmental cases. Since many of CLAPV's members possess strong legal backgrounds, they have been able to advise Chinese lawmakers about improving environmental legislation.

CLAPV's Trans-boundary Water Pollution Case

Wang Canfa believes that environmental mediation is a great concept and sometimes has helped two government entities find a solution to cross-border pollution problems, but in cases of individual pollution victims versus an industry mediation has not been very successful. Thus citizens only have the option to file cases in the court. However, as he illustrated in one case study, getting to court can be difficult for individual citizens.

CLAPV is currently engaged in a cross-border water pollution case centered around a reservoir in Jiangsu province where 67 residents sued upstream polluting factories located in Shandong province. In September 1999 and June 2000 two particularly large pollution incidents sparked conflict between the Jiangsu fishers and the Shandong factories. Wastewater emissions from factories in Shandong killed 2,830 cage boxes of fish that belonged to 97 fishers in the reservoir. A study by the Ministry of Agriculture estimated damages to the aquaculture to be 5.60 million Yuan and damage to the wild fish population was nearly twice as high at 11.6 million Yuan.

The local government in Jiangsu province required that the residents and the factories mediate the problem, but the factories ignored the order. The fishers were angered by this lack of response, so they dumped truckloads of dead fish at the factory gates. Because it was summer, the smell from the fish permeated the entire city and local police clashed with the fishers trying to force them to remove the rotting fish.

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The local government in Shandong immediately called their counterparts in Jiangsu asking them to encourage the belligerent fishers back home with the promise the factories would fix the water problem as soon as possible. After a year of negotiations and mediation the two governments could not even agree on real losses or compensation, thus the fishers decided their only route was to sue the factories. However, these fishers had been completely impoverished by their loss of livelihood so they could not afford the fees to take the case to court. [4] Luckily CLAPV came to help them with these fees and find them pro bono lawyers for the case.

Similar to the Hebei case discussed above, the defendants argued that although fish were killed, their wastewater met national emission standards and was therefore legal. They also argued that because the river went through three cities and nine counties, they were not responsible because any number of thirty factories could have been responsible. In addition the defendants pointed out that the reservoir was built for water retention and they could not be responsible for damaging illegal fish farming. The plaintiffs countered this last point with the fact their local government had long encouraged the development of fishing in the reservoir. Moreover, studies indicated the harmful wastewater could only have come from the two factories owned by the defendants. While often un-enforced, according to Chinese law even if factories meet national standards, they are still responsible for damage caused by their emissions. The court ruled that the factories should pay 5.6 million Yuan to victims and 480,000 for court fees. The defendants appealed to Jiangsu higher court, which six months later supported the

lower court's ruling.

While the fishers won the case, they then faced another major hurdle in pollution cases—enforcing the decision. In this case the factories refused to pay and the plaintiffs asked the court to enforce the judgment. In June 2002, the Jiangsu provincial court had to ask a Shandong court to force their province's factories to pay the penalties. To avoid running into local protectionism, the Shandong provincial court asked the regional railway court to enforce the penalty.[5] This court did not take action for six months, which led the fishers in Jiangsu little choice but to take to the streets again and apply to demonstrate on Tiananmen Square. The application to demonstrate in Beijing brought this conflict to the attention of central government officials, who then implored the local and provincial governments in Jiangsu and Shandong to solve this problem. The railway court therefore agreed to meet with the victims, but after several months of continued intergovernmental haggling the courts still have not enforced the settlement. While CLAPV has been breaking legal ground to resolve water conflicts, as the next section illustrates, a small number of Chinese NGOs have begun to empower citizens in the area of water management.

NGO Roundtable in Beijing

During the study tour in Beijing, the China Environment Forum gathered some key environmental NGO activists for a roundtable to discuss the growing power of civil society groups in China and their role in promoting greater citizen voice in water management and protection issues.

China's Atypical NGOs

Li Lailai (Institute of Environment and Development) kicked off the NGO roundtable discussion with the observation that in China the concept "nongovernmental organization" embodies a broad range of organizations—legally registered NGOs; government-organized nongovernmental organizations; NGOs that obtain registration as businesses; and informal, unregistered grassroots activist organizations. This great variety of green groups is a result of the difficult NGO registration process, which has led some green activists to favor registering themselves as a for-profit business. This business registration option gives green groups more operational freedom, but is simply too costly for most environmental groups. Consequently, the vast majority of new green groups are operating illegally in China as small, *ad hoc* community groups, volunteer or Internet organizations. While such "illegal" organizations are often so small the government does not close them down, they do face difficulties in gaining legitimacy in the public's eye and in retaining staff due to low salary and lack of benefits. Thus, it is difficult for these illegal groups to become stable organizations. Even legal green NGOs have their own limitations, for many lack mechanisms for transparency in terms of operations and accounting, which hinders their ability to obtain international funding, a crucial source of support for such organizations.

Li Lailai maintained that these different social organizations are part of a new phenomenon based upon significant, yet incremental institutional change in China, which is fueling the drive towards a mature civil society. Although the lack of legal status may limit their capacity, green NGOs still play an important, albeit unique role in furthering environmental ideals in the country by concentrating their efforts on public advocacy not lobbying politicians. For example, they organize environmental education campaigns for the general public and students, set up stakeholder dialogues around watersheds, and inform journalists of environmental injustices or corrupt local governments. As the following speakers in the roundtable illustrated, however, green activists in China are starting to test the political waters by undertaking stronger advocacy to influence policymakers—most notably in helping to get the public involved in implementing China's new Environmental Impact Assessment Law as a means of halting ill-conceived dams.

NGOs Building Citizen-Government Collaboration

The Chinese government's "Go West" development campaign—an effort to spread the economic success of the east to poorer inland regions—has the potential to detrimentally impact water resources in western China. Both central and local governments tout water diversion and hydropower development projects as key infrastructure development to invigorate economic development in the west. However, these large-scale infrastructure projects also pose a serious risk to the poor, often marginalized citizens who have made a living off of local watersheds. Through his Yunnan-based NGO Green Watershed, **Yu Xiaogang** is engaged in small-scale, participatory watershed management to deal with the problems posed by growing, unchecked development in western China. Yu maintained that community-based, NGO involvement encourages both good governance and local empowerment.

Green Watershed's primary project area is an ecologically diverse and multicultural area in Lijiang, where in recent years increased development and government intervention in the area has taken a toll: In nearby mountainous regions, logging bans have decimated one of the few local industries and increased the poverty rate. In addition large-scale water transfer projects draining a lake and wetland area have created a booming tourist industry in Lijiang city, but have decimated the upstream regions, where citizens lose an average 500 Yuan a year due to flooding and insufficient water resources. In the water transfer project area there was an unforeseen domino effect: Villagers who normally made a living in the agriculture sector were forced to begin fishing. Not surprisingly, the marked increase in fishing led to severe over fishing. With fewer fish in the ecosystem, migratory waterfowl soon left the area in search for sufficient food. Moreover, the destruction of the wetland also meant fewer jobs in the village, which made it necessary for younger villagers to move to large cities in search of work; many young women have found their only opportunity for work in the underground sex industry. In response to the ecological destruction the local government chose to simply ban fishing rather than address the core problems created by the water diversion—a decision made without involvement of all the local stakeholders.

Under the auspices of a Mekong Upper Basin project sponsored by two international NGOs—Oxfam America and International Institute for Rural Reconstruction—Green Watershed has attempted to involve all relevant stakeholders, give citizens voice, and help resolve the many problems facing residents in Lijiang. Constructive dialogue involving citizens, local, provincial and central governments, Yu insisted, is crucial for achieving true sustainable development. At the heart of this multi-stakeholder project was the creation of watershed development committees, which included participants from several levels of government, wetland protection bureaus, fishery associations, and villagers. In addition to devising strategies to reverse environmental degradation and better manage water resources, the committee addresses issues of food and livelihood security, as well as methods of building local citizen capacity for environmental protection.

Beginning in 2000, Yu reported that his NGO has participated in a number of capacity building activities. The project has gone to great lengths to encourage women to participate in decision-making and take a more active role in the economy. Yu proudly discussed the successful construction of a road to connect upland villagers previously cut off from other lowland areas. Though they have had great success involving local residents like never before, Yu also outlined some potential challenges in the future. Yu reported that initially the central government was quite interested in their work. More recently, however, officials have begun to pressure the group to roll back its projects. According to Yu, the Ministry of Water Resources (MWR) has been given the green light to lead a 200 million Yuan investment in further dam building in western China. The stakeholder advocacy promoted by Green Watershed would likely get in the way of this development and the MWR and dam construction companies would rather not deal with them. While the Chinese government has recently touted its adoption of an Environment Impact Assessment Law as a way to empower citizens in infrastructure development projects Yu believes that this law is not enough, as it does not include a social impact component. While he admitted that government officials occasionally investigate Green Watershed, Yu believes that because his group is a domestic NGO, he has more latitude to do dynamic work than international NGOs, who are under even greater scrutiny.

Chinese NGOs Change

In some instances, green groups in China have become involved in environmental issues at the request of citizens, indicating a growing trust in NGOs. One of the more contentious environmental issues in China has been the recent proliferation of new dam construction. **Lü Zhi** (Conservation International, CI) recounted one particularly telling story about a group of Tibetan villagers who sent a letter to CI's Beijing office expressing their opposition to a dam slated to be built on what they considered a sacred lake. The villagers fears were not just rooted in superstition; they were concerned that the dam was planned too close to a volatile earthquake fault and worried that the dam would degrade their tourism-based livelihoods. CI staff and other Beijing environmentalists were spurred to action, beginning their work by sending a group of investigative journalists to survey the situation.

In addition to the initial concerns expressed by the villagers, the journalist team discovered that the dam was to be built on a protected scenic park. Evidently, during the approval process, neither the provincial government nor the State Environmental Protection Administration (SEPA) bothered to visit the proposed site—the Ministry of Construction that

managed the park had pushed for the infrastructure project. After making these discoveries, the NGO leaders began to organize media coverage on the project's ecological problems and called on central government officials to reevaluate the situation. Lü Zhi also gathered a group of twenty environmental experts to author a formal letter of recommendations, outlining legal and environmental problems posed by the dam project. Although the leadership has not responded, Lü Zhi believes this is not altogether a bad sign. She is somewhat optimistic that because the government has not rejected their claims, there is still hope for the project to be changed or cancelled.

The NGO community has also welcomed the increased independent role played by SEPA. In recent years, SEPA has taken a relatively active role at opposing the construction of dams on the wild Nu River. When some government agencies began the process to approve the first major dam on the river, SEPA surprisingly objected to the project. What is more, Lü reported that SEPA insisted its objections be expressly noted in official documents concerning the dam debate. To follow up, SEPA then held a meeting of experts and government officials. Lü participated in this atypical forum and was surprised at the candid discussions. Much of this new willingness to participate in the debate comes from farsighted individuals in the bureaucracy.

Domestic NGOs Green Watershed and Chinese activist academics, who have congenial relationships with the new media and government, are playing an increasingly important role in shaping environmental policies. While international involvement is sometimes helpful in funding or promoting knowledge transfer to China's NGO community, in regards to sensitive environmental issues Lü Zhi insisted it is much more effective for Chinese NGOs and activists to criticize China's policies and decision-makers than international organizations.

WWF-China

While best known as wildlife protection advocates in China, WWF-China is also active in water protection projects that bring diverse groups together to address threats to water ecosystems. **Yu Xiaobo** from WWF-China discussed how in March 2003, WWF-China launched a national task force on river restoration management, designed to give policy recommendations to provincial and central governments. Currently, the task force is focused on the middle reaches of the Yangtze River—with a particular emphasis on restoring the natural banks and wetlands. This work is part of a broader "Living Yangtze River" project—a nine-year $8 million project dealing with ecological preservation and restoration of the river.

Beijing's Water Conflicts

While many southern cities in China suffer from the perennial threat of floods, northern areas have struggled with water scarcity for much of the history of the PRC. The massive Beijing municipality, covering 16,000 square kilometers, is one obvious example of one side of China's paradoxical water crises. With only 300 cubic meters per capita per year of renewable freshwater, Beijing is well under the water scarcity benchmark of 1,000 cubic meters. On average, 75 percent of Beijing's rainfalls occur during the summer months. The little water that does fall during the dry winter months disappears from high evaporation caused by strong winds.

Though these drought conditions have been the reality in Beijing's recent history, the situation was quite different during the early years of the PRC. **Eva Sternfeld**—Director for Research and Institutional Exchange at the China Environment and Sustainable Development Reference and Research Centre (CESDRRC)—reported that in the 1950s Beijing was beset with rain, which led the city to focus on flood control. One of the municipality's primary water suppliers, the Guanting reservoir was built for this very purpose. Yet, after several decades of diminished rainfall, and five years of full-blown drought, Guanting and the other major reservoirs such as the Miyun, have severely diminished water levels (in the case of Miyun, from a high of 4.1 billion cubic meters to only 600 million). Consequently, Beijing has increasingly relied on groundwater—causing the region's water table to drop dangerously low.

Increasingly acute water shortages and unchecked urban development within Beijing municipality have pushed the city to look towards other areas of China to satisfy its water needs. While small water diversions have been part of Beijing's history for hundreds of years, a grand-scale diversion project is currently underway—the construction of three canals to transfer water from the over-saturated south. Though Mao envisioned this scheme, it only received the official green light in 2001 to guarantee Beijing would have sufficient water for the 2008 Olympics. Sternfeld, and many other environmentalists, are concerned about the viability and ecological impact of this project. The quality of water transferred from the polluted Yangtze River is held in question. Moreover, many speculate that the

great distance will result in much of the water evaporating in the open canals. Some experts are similarly concerned that the transfer, while raising the water table, will simply increase salinization, making the increased groundwater reserves useless.

The south-north water transfer project also has the potential for causing inter-provincial conflicts. In Wuhan, for instance, local officials are concerned that diverted water will negatively affect their own currently sufficient supply. Other provinces are raising objections over the distribution of water; though Beijing is in dire need of water, so too are other dry cities. Many provinces are worried that Beijing, as the seat of government, will receive preferential treatment at their own loss, particularly in the agricultural sector. Sternfeld predicts that this water transfer project will only increase the instances of urban/rural water conflicts.

The Jiang River is one area that has seen far fewer conflicts among neighboring provinces because of the newly introduced water transfer schemes.

The biggest roadblock to solving Beijing's water problem is a lack of knowledge among the populous. Sternfeld does not believe that many urban citizens are aware of the severity of Beijing's water shortages or appear to care about the origin of their water drinking water. To deal with the problem, Sternfeld and her CESDRRC colleagues are preparing water saving guides to educate citizens. They also are working to convince local and central water bureaus to promote an open and honest dialogue with citizens as a first step to promote conservation.

China's Water Market Experiments

In China, one of the major causes of water scarcity stems from an unclear property right regime that has made water common property. According to **Wang Yahua** (School of Public Policy & Management at Tsinghua University), unclear property rights have led to low efficiency in water use. To be sure, water distribution in China is not a complete free-for-all, for administrative measures are employed to try to assure adequate and/or equitable supply across the country. Yet, as China begins to embrace a market-oriented economy and as administrative measures grow more costly, there is great potential for market measures to better control water resources. Wang profiled several case studies that reveal the beginnings of a more market-oriented water allocation system in China—they also, however, serve as examples of the difficulty in completely abandoning the traditional administrative system for water management.

In some rural regions of the country, individual farmers are involved in small pilot trials of water right transfers. Individual water transfer is not altogether new in China, as low-level trade occurred sporadically during the Qing Dynasty. The system being tested now, however, is more formal and institutionalized in nature. Wang interviewed one farmer in a test area of Gansu province who received 800 cubic meters (m^3)of water from the local water bureau. Under the water rights scheme, he was allowed to sell any excess back to other farmers; having employed water saving measures, the farmer was able to sell 200 m^3 to a neighbor at 0.2 RMB per m^3. The same farmer, in following months, needed extra water and was easily able to purchase an allotment from his brother. Wang noted that this individual transfer level not only assures enough water for all rural residents, but also reduces waste and offers the opportunity for farmers to collect some additional income.

Wang examined an instance of larger, "organizational level" water transfers. Along the Yellow River in Inner Mongolia, a power plant was in need of water beyond its original 5 million m^2 allocation from the Yellow River Conservancy Commission (YRCC). While the plant could have installed an air-cooling system, which would eliminate the need for more water, the plant concluded that purchasing additional water from the local government would be more cost effective. Another illustrative example of higher-level transfers occurred between two cities in Zhejiang province. In China, it is not uncommon for the central government to demand that one water rich city or province transfer water to another where water is scarce. Yet, in Zhejiang one city, in need of water, was not willing to wait until a higher level of government forced another city to transfer water, opting instead to spend 200 million Yuan for 50 million m^2 of water from a neighboring city. The transfer—while not officially legal under the current water rights system—was a windfall for the two cities: One received clean water on their own

timetable, while the city with a surplus collected quite a bit of unexpected money.

Wang argued that market water transfers also have the potential to solve and prevent water conflicts. The Jiang River is one area that has seen far fewer conflicts among neighboring provinces because of newly introduced water transfer schemes. The river, which travels through several provinces, has been beset by problems of pollution and unequal distribution along its banks. After a major water conflict erupted between Hebei and Henan provinces in 1999, the Ministry of Water Resources (MWR) adopted new water allocation and trading schemes to solve previously impassable conflicts. Under the new inter-provincial agreements, water rich areas in the upper reaches of the Jiang River would be allowed to sell excess water to parched areas in the lower reaches. In one major transfer, the lower reaches paid 7.5 million Yuan for 15 million cubic m^2 of water. The two provinces viewed the transfer as a far more equitable solution, bypassing the central government. In the past, the central government's top-down solutions often have resulted in unfair plans benefiting one province, at great expense to another. On the Yellow River, for example, Shandong provincial officials approached the central government directly in hopes of finding a solution for their water shortage woes. Instead of engaging all the neighboring provinces in a dialogue to arrive at a fair solution for all parities, the government directly allocated water from an upstream reservoir that was intended for other provinces.

MWR is exploring additional strategies to employ new methods to solve water conflicts. For example, Wang Yahua reported that the YRCC is considering a plan that would store extra water in a reservoir as a "water bank." When water is needed, the needy province, county or city can pay for the user right. On a larger, and far more problematic level is the government's south-north water transfer project, which is very much centered on economics. For those provinces and cities along the transfer route, the more money they invest in the construction, in theory the more water they are to receive at its completion.

Based upon his extensive research, Wang concluded that though water markets are new in China, they are increasingly playing an important role to solve water conflicts. And while these markets are certain to develop further, because of the powerful water bureaucracy in China, administrative means of water allocation will not disappear anytime soon. Wang predicted instead that water markets will simply supplement the administrative allocation methods.

State Environmental Protection Administration and Water Conflict Resolution

The Chinese State Environmental Protection Administration (SEPA) is becoming more involved in cross- provincial water pollution conflicts that have been growing in number and severity over the past two decades. China's first water pollution law in 1984 (revised in 1996) gave SEPA the role to regulate end-of-the-pipe pollution focusing on individual pollution violators. In response to the rapid drop in water quality and increase in water pollution conflicts, SEPA has expanded their focus on water to include pollution prevention, monitoring, and control at a basin level.

As part of their basin-level work SEPA is currently drafting and seeking provincial government input on a policy to address cross-provincial water conflicts. Many provincial government officials have insisted that SEPA needs not only to focus on water quality, but also on watershed monitoring and management. SEPA's efforts to more holistically manage water quality at the basin level was enhanced in the Tenth Five-Year Plan, which targeted three large lakes, three rivers, and two oceans for water quality improvements. Under this plan SEPA has been carrying out an extensive study to accurately assess water quality in these major water bodies and to identify the main sources of pollution in order to improve control measures and prevent further disputes.

In her many years in SEPA's Pollution Control Department, where she currently serves as the vice-director, **Liu Hongzhi** has been involved in many cases of inter-provincial water pollution conflicts along the Hui River and disputes between Zhejiang and Anhui provinces. In the face of growing inter-provincial water conflicts SEPA has: (1) experimented with creating collaborative working groups, (2) managed compensation solutions, (3) mediated inter-provincial water pollution conflicts, and (4) set up monitoring centers and hotlines.

Collaborative working groups. SEPA has made progress in managing water conflict between two cities in Jiangsu and Zhejiang provinces—Jiaxin and Suzhou. SEPA held a joint meeting with the municipal governments to create a water pollution prevention team made up of government leaders from the legal, environmental, water, and urban construction departments in the two disputing cities. This team was set up to hold biyearly meetings and form smaller teams to monitor water pollution problems and implement pollution control measures in both cities. The teams also submit reports to SEPA on their progress in water pollution control. Since the joint meeting and teams

were established there have not been any large water conflicts and small conflicts are now quickly resolved through the new communication channels.

Managing and monitoring compensation. In addition to convening conflict resolution teams, SEPA has been involved in monitoring and managing compensation solutions between provinces. For example, after evaluating a water pollution conflict stemming from upstream emissions into the Yellow River by cities and factories in Shandong that caused hardships in downstream Hebei province, SEPA asked Shandong to provide three million Yuan to Hebei as compensation for the pollution damages. The compensation was paid by reallocating central government monies from Shandong to Hebei, which Hebei then used to compensate fishers who had suffered damage from Shandong's pollution. In another case, SEPA succeeded in pushing one polluting province to compensate another by simply threatening to hold back state monies. Such *ad hoc* punitive compensation schemes are becoming increasingly common in China, but the notion setting up regular payment for environmental services schemes—in which downstream provinces pay upstream provinces for protecting water resources—has not yet been introduced on a large scale in China. Two strategies to improve pollution control to limit conflicts have been central government loans and subsidies to finance wastewater treatment plant projects and central mandates that require local cities to finance projects. These top-down strategies have only partially improved the water quality situation. In the late 1980s, a mere 10 percent of urban wastewater in China was processed and today this treatment rate has only risen to 34 percent. In rural areas, however, far less wastewater is treated.

Inter-provincial mediation. Within all of China's seven large river basins economic growth has produced a growing number of inter-provincial water pollution disputes. Since SEPA cannot regulate all of these conflicts it chooses instead to regulate some of the most severe ones—to date SEPA has successfully mediated ten inter-provincial water conflicts. Liu Hongzhi acknowledged that SEPA must increase its capacity to encourage cooperation between provinces on water quality control problems, which is why she traveled to the United States in 2003 to examine various conflict resolution techniques. She related one U.S. example that made a deep impression on her—a major water pollution conflict between Oklahoma and Texas had to be settled by the Supreme Court, which ruled that Oklahoma must transport water to Texas that meets the latter state's water standards. Only recently has SEPA sent a major inter-provincial case to the courts in China—a highly contentious water pollution conflict between Shandong and Jiangsu provinces that could not be resolved by mediation. Neither province would accept a ruling of a local court, so China's Supreme Court is currently deliberating the case. Since this is one of the first such cases to go to China's Supreme Court, it merits mention that the court does not have any legal precedence upon which to base environmental compensation regulations. Therefore the Supreme Court has requested that local governments establish some compensation regulations to help guide the ruling.

While citizens can sue a factory for negligence, [...] government agencies cannot be sued for poor enforcement of pollution control laws.

SEPA has set up a third independent party mediation system within the seven major river basins to regulate and oversee water management problems, but SEPA can only mediate water pollution issues. Other bureaus mediate other water conflicts—e.g., fishery bureaus mediate conflicts around fishing and water bureaus deal with water quantity conflicts. Clearly some conflicts cross these jurisdictional boundaries, which can lead to inter-bureau tension and obstacles in helping disputing parties find solutions.

While SEPA does have 40,000 environmental policemen to collect information, perform inspections, and conduct other monitoring activities, these numbers are not sufficient to monitor all water pollution problems. To collect pollution data in a more timely manner, SEPA has begun to set up automatic monitoring stations, which could prove very useful in resolving water pollution conflicts cases, which often suffer from inadequate water quality data.

Water pollution monitoring centers and hotlines. Liu Hongzhi maintained that it is not enough for SEPA to simply take water quality measures after the problem appears, therefore SEPA is considering ways of putting pressure on local government officials to push them to take more responsibility in managing water conflict issues. To assist local governments in this task SEPA recently set up a major water pollution monitoring

center. This center sends experts out to monitor and mediate water pollution incidents as soon as they are reported. SEPA staff responsible for water also has begun to issue reports to the news media about the water quality status of rivers, for they believe making this information more transparent can put pressure on the polluters to solve the problem.

Citizens also can use this information in the news media to take irresponsible factories to court for polluting local waterways. Another check citizens have on polluting industries or lax regulatory work is a hotline SEPA set up for citizens to report water pollution problems. If a call leads to a court case, the citizen who reported it can collect a reward. It merits mention that while citizens can sue a factory for negligence in a water pollution accident, government agencies cannot be sued for poor enforcement of pollution control laws. The one mechanism that does exist to push for good government performance in enforcing laws is the promotion system, which evaluates an official's job performance. However, environmental performance is rarely a criterion for job promotion, which SEPA's Minister Xie Zhenhua would like to change with the adoption of a green GDP.

World Bank Water User Association Projects

Irrigation accounts for over half of China's cultivated land and 70 to 80 percent of agricultural output. However, China's irrigation systems are plagued with a vicious cycle of problems—inadequate cost recovery and maintenance, declining infrastructure, management inefficiencies, falling output, water wastage, and low water fee collection rates. Not surprisingly the problems facing irrigation systems in China also are a source of increasing conflict among water users. **Richard Reidinger** (World Bank water expert) explained that the World Bank's irrigation projects in China have emphasized how better management and greater farmer participation are keys to breaking the vicious cycle of problems. Thus, the World Bank has worked for many years in promoting the creation of self-financing irrigation and drainage districts (SIDDs), in which farmers are organized into water users associations to better manage and limit conflicts in large-scale irrigation projects.[6]

Prior to Deng Xiaoping's agrarian reforms that sparked the creation of family farms, all irrigation systems were run by a collective that took water from the system and distributed it to the various villages and production teams. With the creation of the household responsibility system in the early 1980s collectives were eliminated and there was no one in charge of distributing water for the irrigation systems, which led to many conflicts. The water user associations the World Bank began creating in 1995 on the North China Plain (in Shandong, Jiangsu, Anhui, and Hubei provinces) were created to fill this gap. One sign of the success of these pilot associations was when in 2000 the MWR issued a circular that stated water distribution should be done by water supply associations, which was the first time these water user associations were formally recognized by central government law.

Endnotes

[1] It is unclear if the fishers will ever see all the compensation—Sun Junbao believes they may only get 50 percent of what they are due. Generally in China successful enforcement of penalties depends on the amount victims demand—plaintiffs demanding smaller amounts tend to have a higher probability of winning cases and collecting the money. Large compensation cases are difficult, for example, Wang Canfa (law professor at Beijing Politics and Law University) recently won a case in Jiangsu province in which the plaintiff asked for one million Yuan but ultimately received only 500,000 Yuan.

[2] There is a People's Committee at every level of the Chinese government responsible for mediating conflicts, but administrative agencies may also be asked to mediate a case.

[3] If agencies refuse to mediate the victim in theory has the right to make a formal complaint to the local or higher level of government.

[4] Many fishers fled the area to hide from banks seeking repayment on loans, while others took children out of schools because they lacked tuition money.

[5] In China courts are divided into two categories: regional and industrial, the latter courts sometimes are above pressures by localities in enforcing their rulings

[6] For a through introduction to the World Bank water user associations see presentation by Spencer and Reidinger at: http://www.worldbank.org/watsan/waterweek2003/18%20Water%20User%20Associations.htm

Water Conflict Resolution in China

28 January 2004 China Environment Forum Meeting

Ma Jun, Sinosphere
Wang Xuejun, Beijing University
Yu Xiubo, Institute of Geographic Sciences and Natural Resource Research

By Timothy Hildebrandt and Jennifer L. Turner

Fast-paced and wide-reaching development is straining water resources around the world. With global demand at an all-time high, and supply at historic lows, fresh water is an issue in conflicts in many countries. While transboundary water conflicts such as those in the Mekong River Basin receive international press, most water conflicts receive little attention. The little heralded majority of water conflicts arise between citizens and local industries, or among provinces, counties, and cities. Such domestic water conflicts are increasingly common in China, which is doubly cursed: floods beleaguer southern provinces while droughts plague the northern regions. In response to water scarcity problems, the Chinese government still tends to focus on increasing supply, sparking major dam and water transfer projects. Such projects may only temporarily solve the water shortage and often create other problems or conflicts, such as in the case of the Three Gorges Dam, which led to the displacement of over 1.5 million people. Over the last twenty years as industrialization has boomed in China, water pollution problems between provinces have grown increasingly intense and defy peaceful resolution. The growing frequency and intensity of water-related conflicts are not only causing more human suffering, but also represent a threat to China's rapidly growing economy, making quick resolutions even more important.

Recognizing the challenges of water-related conflicts, the China Environment Forum created a Water Working Group that brings U.S. and Chinese experts together to share lessons learned, discuss conflict resolution methods, and identify opportunities for cooperation. This project is part of *Navigating Peace: Forging New Water Partnerships*, a broader initiative by the Wilson Center's Environmental Change and Security Project that examines the role water plays in conflict and cooperation. At this meeting of the China Environment Forum, several Chinese members of the working group discussed their own experience with China's water conflicts and reflected on insights they learned from study tours in Tucson, Beijing, and Washington, DC. They noted the differences and similarities of domestic water conflict between the United States and China and also contemplated some solutions that could be implemented in China.

A Long History of Water Conflicts

Disputes over water have, in recent years, been an increasingly common occurrence throughout China. **Ma Jun** began his talk by quoting the director of the head Policy and Regulatory Department of China's Ministry of Water Resources Gao Erkun, who reported at a July 2003 meeting that from 1990 to 2002 over 120,000 water quantity conflicts had been reported to the ministry.[1] Ma Jun emphasized that water conflicts are not just born out of water scarcity issues, but also out of some of the government's large engineering projects that were originally intended to solve water shortages. While such projects may solve water scarcity problems, they sometimes produce conflicts around population resettlement or disputes on how the water should be used.

Water scarcity conflicts are by no means reserved for one group of the population or region of the country. Rather, the disputes sometimes are between provinces, government agencies, and even individuals and industries. In short, conflicts know no geographic boundaries and often have been spanning decades of the PRC's history.

Fighting over Scarce Water

Beginning as far back as the 1950s, a series of water conflicts has plagued villages along the Zhang River, which is in the Hai River Basin and flows between Hebei and Henan provinces. For centuries villagers on both sides of the Zhang River maintained friendly ties, in part because many became relatives through marriage. However, the relations turned sour in the late 1950s when the demands for water rose sharply. Under the guidelines of the Great Leap Forward, local people raced to build large and small water facilities to

Ma Jun

Credit: David Hawxhurst

expand farming. One of the projects, the Red Flag Canal, which was dug through rocky mountains, became a national model when it was completed in early 1960s. People all over China went to learn from the experience of the Linxian County for creating a "milky way on earth" with their bare hands.

The other side of the story was not that rosy at all. In fact the Red Flag Canal and other projects brought not just water, but decades of fighting and bloodshed. Ma Jun reported that in the early days of the conflict, villagers engaged in near-guerilla warfare, using explosives, guns, and cannons to retaliate against those who stole water. The conflict became relatively dormant in the 1970s but exploded again in the 1990s due to drought and growing water needs. In 1991 villages mortared each other and the next year one village sabotaged a water diversion tunnel, which fueled the resentment that led to mass clashes with many injuries several years later. By the end of the decade, the conflict reached a point where major explosions and mortaring resulted in the injury of nearly 100 villagers.

The resolution of the Zhang River conflict is quite complicated, for while the villages in the two provinces clash over day-to-day water needs, the disputes over water allocation are between counties on both sides, both of which pressure the Hai River Conservancy Commission (HRCC) for more water. Ultimately the provincial governments and the HRCC must find a way to fairly allocate water and resolve the conflicts, which after nearly 50 years of simmering and exploding are quite challenging. To meet this challenge the HRCC set up a special water management office just for the Zhang River, which is beginning to make some headway in calming parties and negotiating solutions.

Certainly, a great number of the conflicts take place the countryside, far from the central government's easy reach. However, Ma Jun stressed that cities are by no means immune from water conflict. Urbanites have suffered from water problems, and thirsty municipalities have also often been the source of conflict. When Beijing was named the capital of the PRC in 1949, the city was able to rely on its existing reservoirs to provide water for the relatively small population. But rapid population growth forced the city to tap resources outside of its own river basin. Beijing city officials mandated that the neighboring city of Tianjin to forfeit the use of its main reservoirs (the Miyun and Guanting). Tianjin then had to build the Panjiakou reservoir to bring water from the Luan River, which is located in northern Hebei province.

To quench the thirst of huge cities like Beijing the government is taking drastic supply-side management measures rather than push strict water conservation. Beijing's reach to other basins has led to the 2002 decision to commence construction of huge water transfer canals from the Yangtze River. These canals are an untested and costly water transfer scheme that could produce conflicts between recipient cities in the north and supply regions in the south China. Moreover, smaller cities in the south could lose their own water. While the first planned canal is along the east coast, supplementing the existing Grand Canal, the second and third canal routes may displace large numbers of people.

Such relocation has been seen in record numbers as China has begun to fill the reservoir of the Three Gorges dam. This project specifically, and hydropower schemes generally, according to Ma Jun, are another major source of water conflict in China. While relocation on the scale of the Three Gorges dam will likely not occur again, Ma Jun speculates that China's energy needs will result in more hydropower projects, additional forced relocations, and ecological degradation, which could spark an upsurge in water-related conflicts.

Water Pollution Conflicts

Although water quantity is a major problem in the North, throughout China, water quality is increasingly the primary cause of conflicts over water. Ma Jun highlighted the example of the city Shengze in Jiangsu province, which is a center of China's textile industry, a historically high polluting sector. In the mid-1990s, factories in the city discharged an estimated 90 million tons of wastewater into rivers flowing south into Zhejiang province. This pollution caused serious damage to the aquaculture and fishing businesses in villages just across the border. Since provinces in China are of equal political standing and lack effective mechanisms

to mediate such conflicts, it is not surprising that after years of failing to pressure their provincial government to act and force Shengze to halt the pollution, the affected villagers in Zhejiang took the situation into their own hands. Locals spent nearly 120,000 USD for 8 bulldozers to fill and sink 28 boats loaded with cement and tens of thousands of sandbags, which created a dam in the 50-meter-wide river at the border. Such drastic measures are increasingly common throughout the Chinese countryside as pollution becomes a thorn in the economic side of rural areas. Economic loses in the villages in Zhejiang, for instance, ran to 6 million USD in 2001 alone. Health effects in the villages from the toxic pollution also caused much alarm with the rate of alimentary tract cancer rising by 58 percent from 1996 to 2002. Perhaps most shocking, Ma Jun noted that in one of the affected areas, no young men could pass the physical test required for military service in 2000.

Clearly, the present state (and grim future) of water conflicts makes resolution a top priority for the Chinese government. According to China's National Water Law (passed in 1988 and updated in 2002), interregional water disputes are supposed to be resolved through negotiation. If this negotiation fails the conflicts should then seek resolution through arbitration by government agencies at the next higher level. Disputes between individuals and companies are supposed to be resolved through mediation and litigation.

The Chinese government seems to acknowledge the necessity of water conflict resolution: the Minister of Water Resources employs 60,000 people to deal with water quantity conflicts alone. The State Environmental Protection Administration, which is responsible for resolving water pollution conflicts, is currently drafting and seeking provincial government input on a policy to address cross provincial water pollution disputes. Ultimately, it will be crucial for SEPA and the MWR to eventually unite in trying to resolve water conflicts, for water quantity and quality are often linked problems. Despite a tremendous commitment of staff, ad hoc administrative arbitration methods do not always work and local water and environmental agencies struggle to enforce judgments because of rampant local protectionism. Some disputing parties resent solutions enforced from above.

Instead of depending on administrative arbitration for water conflict resolution, some areas of the country are experimenting with centralized watershed management systems, which often assure more effective water allocation and regulation and could serve to prevent conflicts in the first place. The Yellow River Conservancy Commission (YRCC) has been particularly successful in its efforts to begin managing the whole watershed and regulate water allocation. In the mid-1990s as the basin suffered from long-term droughts, extreme withdrawals by upper and midstream provinces left downstream provinces dry and the river did not reach the ocean for over 200 days a year. In the late 1990s when the YRCC began implementing watershed management measures all provinces were strictly limited in withdrawals and more water was allocated for in-stream ecological health—the river flow now reaches the ocean, in a steady, though tiny stream.

Though this management system has been effective it has not resolved all inter-provincial disputes in the basin. Ma Jun maintained that some of the river basin commissions in the eastern United States that give local governments, nongovernmental organizations (NGOs) and citizens a voice in influencing basin conservation strategies might be more appropriate in China. As he learned on the U.S study tour, it is more desirable to have a management system that is in the control of all relevant stakeholders and not a powerful, unwieldy government agency, as is the case in China. Reflecting on the working group's visit to Tucson, Arizona and the U.S. Institute for Environmental Conflict Resolution, Ma Jun was intrigued by the notion of third party neutral mediation, but acknowledged the difficulty of translating the system to China, as individual water rights have yet to be defined.

Strategies for Resolving Conflicts in the Yellow and Yangtze Rivers

China is home to both the third and fourth longest rivers in the world—the Yangtze and Yellow, respectively. Taking into consideration the vast network of tributaries and great number of provinces through which these two great rivers pass, it is no surprise that water conflicts are plentiful within both basins. The threats such conflicts pose for economic growth and human livelihood makes water conflict resolution particularly crucial in these two rivers. In the last decade conflicts in the Yellow river stem from drought and overdrafts by the riparian provinces, while disputes in the Yangtze River arise from overzealous flood control and land reclamation which has destroyed the basin's ecosystem.

Over the past few years the Chinese government has begun to embrace the idea of integrated river basin management (IRBM) in laws and international assistance projects as a way to stem growing water

conflicts. Not surprisingly, the most ambitious studies and projects are taking place in the Yellow and Yangtze rivers.

Reforming Laws to Solve and Prevent Conflicts along the Yellow River

Stretching for 5,464 kilometers and flowing through eight provinces, the Yellow River accounts for 35 percent of China's total water resources and services some of the most economically prosperous areas of the country. In light of its economic importance and serious water conflicts the Asia Development Bank (ADB) joined with the legislative department of the Environmental Protection and Resources Conservation Committee, National People's Congress to create an international team of lawyers, policy experts, economists and engineers to evaluate the pitfalls of current river basin governance and identify solutions.

Wang Xuejun, who is a leading researcher in this Yellow River ADB study, noted the team did not just focus on the water shortage problems currently exploding in conflicts, but also smaller management and pollution problems that potentially will evolve into future clashes along the river.

The study scrutinized existing water management laws and practices at both the national and local levels and evaluated mechanisms for intergovernmental relations within the basin, with particular emphasis on the functions and power of the Ministry of Water Resources (MWR) and the State Environmental Protection Administration (SEPA). The contentious inter-provincial water disputes often remain unresolved due to the lack of clear legal mechanisms for brokering solutions between the parties and poor communication channels among the myriad of agencies involved in river basin issues. Notably, MWR and SEPA have long been embroiled in conflict over their roles to monitor and enforce water laws and regulations in China's river basins. In the Yellow River the two government agencies also do not coordinate or share the data each collects on water quality and quantity in the basin. At the local level, provincial protectionism and lack of transparency in the decision-making process for water quantity/quality management, as well as insufficient involvement of stakeholders in basin or sub-basin organizations are fundamental problems causing overuse and degradation of water that are sparking water conflicts.

The ADB team examined case studies on two types trans-jurisdictional pollution conflicts—those involving individual, village, or city disputes that crossed provincial boundaries and inter-provincial conflicts. The former pollution conflicts are growing considerably fast in number and severity, particularly in the coastal areas of the Yellow River Basin. One coastal conflict the team investigated was between fishers in Changxing county of Zhejiang province and a chemical plant in Guangde county of Anhui province that had degraded the water in the trans-provincial section of the river. Most times in China when individuals or their livelihood is damaged by water pollution, victims must struggle to get the case heard in court—a time-consuming process that often results in rulings the court cannot enforce. On 22 March 2002 the fishers brought their demands for compensation to the Court of the Changxing County. While not usually the case in China, the court ruled in favor of the plaintiffs and the chemical plant was ordered to cover the economic losses (617,500 RMB) and the costs of the court (11,185 RMB). While the court did rule in favor of the pollution victims, ultimately if local authorities had enforced the water pollution control laws, the victims would have been spared suffering and the court case.

In terms of inter-provincial clashes over water pollution, sometimes a pollution crisis affecting multiple provinces does spark local cooperation and conflict resolution. For example, in July and August of 2001, continuous rainfall in Shanxi province breached several mine tailings dams allowing toxic tailings to enter the Qingzhang River, resulting in severe degradation of water quality and a threat to the Yuecheng Reservoir which is the drinking water source for two downriver cities in Henan and Hebei provinces. In this case, the three provinces of Shanxi, Hebei and Henan have enhanced communication in regard to the pollution of the Qingzhang River Basin, which enabled them to coordinate pollution prevention measures. Thus no further serious trans-jurisdictional water pollution incidents have occurred in this section of the basin. While the ADB team did discover some examples of cooperation, most inter-provincial disputes in the Yellow River defy resolution.

After examining the case studies and identifying central legal, management, and administrative problems, the ADB team offered legal and management recommendations for both provincial and national level governments. The team went so far as to suggest revisions of current laws and potential new legislation. Wang highlighted the considerable need for Chinese government agencies to more effectively enforce compliance. Better coordination between agencies and monitoring systems is crucial as well. The project proposed joint ministerial committees to successfully

resolve and prevent problems. To better deal with severe and sudden pollution, the team suggested the creation of an emergency response system. More generally, Wang believed that China could benefit from basin commissions adopting integrated river basin management systems, akin to some of those in the United States to which he was made familiar in the working group's Washington study tour.

Efforts at Ecological Restoration in the Yangtze Basin

The Yangtze is a powerful river that for centuries has subjected people in the basin to devastating floods. It is therefore not surprising that ancient and modern Chinese water managers have endeavored to control this fierce river. According to **Yu Xiubo**, the efforts to control flooding—particularly government-constructed dams—has created enormous natural and man-made problems in the middle reaches of the river. In addition to dams, farmers have build smaller dykes along the river—dykes which in places elevate the river 17 meters higher than the surrounding flood plain. These construction projects have left virtually no natural banks below the Three Gorges Dam.

Though these man-made barriers can serve the irrigation and flood control purposes of farmers in the short term, dykes also separate the river from small lakes that are scattered along the Yangtze. As a result of this physical disconnect, lakes are dwindling in size and reducing in number. Yu profiled the disturbing case of Dongting Lake that used to be China's largest lake at 6,000 square kilometers, but has now shrunk to half its size due to dykes and dams along the river. Hubei province was once known as the province of one thousand lakes. Yet, government projects in the 1950s, designed to increase cropland production and boost flood protection, have made the moniker meaningless. Today Hubei province is home to a paltry 80 lakes. Making the situation even more unfortunate, while the dams and dykes hold back floodwaters they have led to the subsequent loss of lakes and serious damage to the basin's ecosystem. According to Yu, the ecosystem in much of the Yangtze's middle reaches are for all intents and purposes, dead.

International NGOs with significant local involvement, like WWF-China, have resolved to inject life back into the Yangtze by employing the "living river" concept that has been used on the Rhine River. Some of the strategies used to revitalize rivers in Europe and the United States are more difficult in China. Thus the living river concept had to be modified to more appropriately fit the needs of China's unique case. Yu noted that dam removal projects—which he recently learned about at the working group's visit with representatives from American Rivers' Dam Removal Project—are particularly difficult to consider in China for demolishing the great number and small size of dams scattered throughout the country would leave time and money for little else.

WWF-China has, however, begun a program that resolves to "make room for the lakes." Working with four different provincial governments to restore wetlands, this WWF-China project has resulted in 500-square kilometers of former cropland reborn as ecological diverse wetland. In addition, local communities are beginning to voluntarily remove dykes in an effort to reconnect lakes with the river. Yu admitted that the ecological restoration of even a small section of the Yangtze will not be done overnight. He insisted that all stakeholders must develop an overall vision for the river, and improve the communication with and education of the general public on the importance of this effort. More difficult, but all the more important, Yu declared that people must abandon the effort to fight the river and its regular floods and simply relocate. To encourage such a move, WWF has led demonstrations on alternative livelihoods that better mesh with sustainable development in Yangtze River Basin communities.

At the conclusion of the meeting, many audience members expressed an interest in the Chinese view of water conservation. On the whole, Chinese government officials and citizens—like those in the United States—do not pay close enough attention to issues of conservation, but are focused more on infrastructural solutions to secure more water. Ma Jun reported that people are just now gradually realizing that China has reached the limit of trying to manipulate the supply side of water and must tackle touchy issues of demand-side management. While some central and local water officials have raised the issue of conservation, Ma Jun noted that talk is difficult to translate into action. China must, he insisted, find ways to help the general public realize the need for conservation.

Endnotes

[1] Gao Erkun's full talk can be read in Chinese at: http://shuizheng.chinawater.com.cn/zhxw/20030730/200307300017.asp

eeBuildings: Sharing Strategies for Improving Building Energy Performance in Shanghai

In December 2003, **eeBuildings**, a U.S. Environmental Protection Agency initiative that promotes the efficient use of energy in buildings internationally, received welcome news from Mr. Tang Jian Ping in Shanghai. Mr. Tang is manager of one of the largest commercial property management companies in Shanghai, the Shanghai Hongqiao Economic & Technological Development Zone Property Management Company. He reported that in one year, he was able to reduce the energy consumption of the New Town Center, a fifteen year-old 27,000 square meter office building, by 15 percent. Mr. Tang attributed these major savings to a series of simple, low-cost building operational improvements he implemented after attending an eeBuildings-sponsored training event in January 2003. For eeBuildings, Mr. Tang's experience was evidence of the viability of the program's unique approach to reducing energy consumption in commercial buildings:

> *The fastest, least-costly, and most significant reductions in energy use can be achieved through improved management of building systems operations, using best practice techniques and the existing digital control system.*[1]

The eeBuildings Approach

eeBuildings is a voluntary market transformation initiative of the U.S. Environmental Protection Agency (EPA) that brings lessons learned from EPA's ENERGY STAR program to developing countries. In 2002 alone, ENERGY STAR helped nearly 12,000 organizations, representing more than 1.1 billion square meters of building space, save approximately 161 billion kBtu (47.3 billion kWh) of energy through voluntary investments in technologies and practices to reduce energy consumption. In China, eeBuildings is working directly with owners and managers of large commercial buildings to help them identify low-cost and no-cost measures that can immediately reduce building energy use, operating costs, and greenhouse gas emissions. As of January 2004, the program has trained 130 building owners and managers responsible for 135 large commercial buildings in Shanghai and documented local case studies, such as Mr. Tang's, indicating energy reductions of more than 10 percent due to selected no-cost and low-cost operational measures.

The eeBuildings approach is particularly suited to fast-developing countries that are interested in learning from U.S. experience and creating initiatives that will produce immediate, replicable results. This program's unique approach grew out of the following observations:

1. In the U.S., the most energy-efficient commercial buildings are, without exception, those with management and staff dedicated to superior operations and maintenance. They are not necessarily buildings with more efficient technology.

2. In China, there is little existing commercial infrastructure for delivering energy-efficiency services, such as the replacement and retrofit of existing building equipment.

3. Building owners are reluctant to make significant investments in energy efficiency, particularly with relatively new buildings.

4. Large commercial buildings in Shanghai and other Chinese cities often include relatively advanced building control systems that are seldom used to their full advantage. In addition, building managers are rarely trained in the most effective approaches for managing energy use.

In Mr. Tang's case, he reported that he understood the financial and environmental benefits of improving his buildings' energy efficiency, but he lacked information on what specific actions he could take to realize these benefits. At eeBuildings' January 2003 training event, he learned a number of best practice techniques to improve the energy performance of his building.

How Did Mr. Tang Reduce his Building's Energy Use?

Mr. Tang's first step was to use the U.S. EPA's Benchmarking Tool[2] to determine how much energy the New Town Mansion was consuming annually and if this was comparatively lower or higher than other similar Class A commercial office buildings. Based on an analysis of his energy performance benchmark score, Mr. Tang realized that his building was achieving better than average energy performance, but that there was

room for improvement. Furthermore, a close analysis of his energy bills indicated that approximately twenty-five percent of the building's energy was being consumed during non-operating hours. To reduce the amount of wasted energy in his building, Mr. Tang implemented simple, low-cost operational measures such as the following:

- *Optimized Lighting Schedule*: Re-programmed the Building Automation System (BAS) to control lighting operation time in public space, underground parking, equipment room, and other areas, on as-needed basis, instead of twenty-four hours per day, as previously.

- *Optimized Air Conditioning (A/C) Schedule*: Modified the air conditioning schedule to provide A/C from 7:00 AM to 7:00 PM on weekdays as opposed to fourteen hours per day on weekdays and on weekends. Tenants requesting air conditioning during off-hours were required to pay extra.

- *Coil Temperature Reset*: Based on a combination of outdoor temperature and air conditioner usage, reset the temperature of water leaving the chiller coil.

- *Hot Water Temperature Reset:* Reset the hot water temperature from sixty degrees Celsius to fifty degrees Celsius.

Within one year of implementing the above-described operational measures, Mr. Tang reduced the energy consumption of his building by 15 percent and saw his energy performance benchmark score increase by 16 points. If all Class A commercial office buildings in Shanghai were to achieve annual energy savings of fifteen percent, equivalent to Mr. Tang's, Shanghai property managers could save approximately 229 million RMB ($28 million) annually and reduce carbon emissions equivalent to removing 70,000 cars from the road each year.

eeBuildings in 2004

eeBuildings is organizing a demonstration project showcasing the program's low-cost and no-cost approach. The project will focus on several high profile skyscrapers in Shanghai to document the opportunities for improving building energy performance through better management of building systems, using best practices and the existing control system. The project will involve collaboration between U.S. and Chinese experts. eeBuildings will also continue to support its international partnerships through training events, information exchange through its Web site (www.epa.gov/eeBuildings), and an e-mail newsletter to partners.

For more information, contact David Hathaway, Project Manager, ICF Consulting (dhathaway@icfconsulting.com, 202-862-1173) or Gary McNeil, Program Manager, EPA (mcneil.gary@epa.gov, 202-343-9173).

Notes

[1] Digital Controls are also commonly referred to as Building Automation Systems (BAS) or Energy Management Systems (EMS).

[2] The U.S. EPA Benchmarking Tool (www.epa.gov/eeBuildings/Benchmarking) is an on-line tool that allows building owners and managers to compare their buildings' energy use with other similar buildings worldwide using a rating scale from 1 to 100, where 50 is average performance; The tool accounts for differences in building size, occupancy, operating hours, plug loads, climate, and weather and is intended for use with Class A buildings maintaining international comfort standards.