REACHING ACROSS THE WATER

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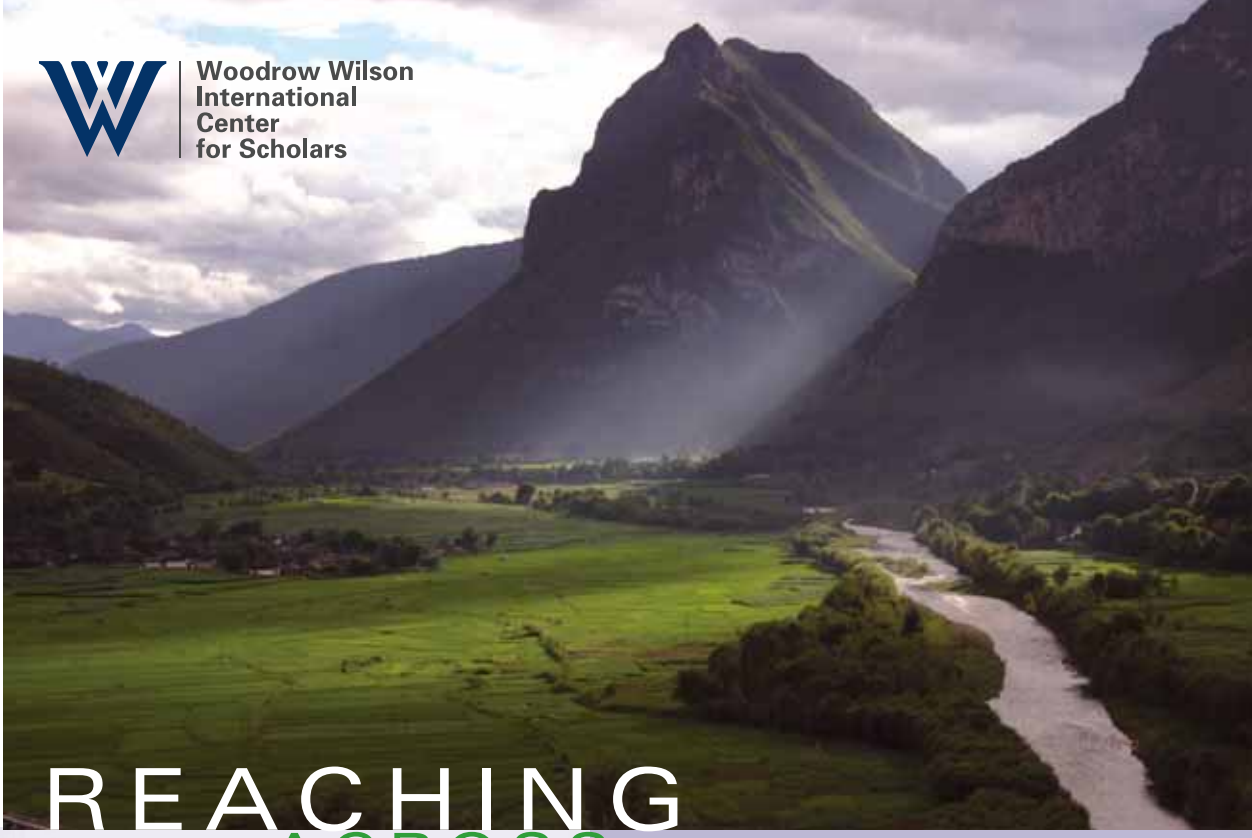

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International Cooperation Promoting Sustainable River Basin Governance in China

JENNIFER TURNER & KENJI OTSUKA

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Cover photo: The valley above Tiger Leaping Gorge, where
a major dam is being planned. (Photo Credit Ma Jun)

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Jennifer L. Turner has been the coordinator of the China Environment Forum at the Woodrow Wilson International Center for Scholars since 1999. As coordinator she organizes meetings and study tours, and creates publications that aim to promote dialogue and collaboration between U.S., Chinese, and other Asian government, NGO, research, and business communities to help solve environmental problems in China. Her current research focuses on water policy and the growth of "green" civil society in China.

Kenji Otsuka is a researcher in the Environment and Natural Resource Studies Group within the Inter-disciplinary Studies Center of the Institute of Developing Economies (Japan External Trade Organization). He has conducted joint research projects with Chinese scholars and researchers since 1993 at the institute. His fieldwork with Chinese counterparts has covered environmental policy process, water resource and river basin governance, environmental pollution disputes, environmental awareness and community/nongovernmental organization activism in China.

TABLE OF CONTENTS

PREFACE AND ACKNOWLEDGEMENTS

This report on water challenges facing China developed out of a joint project between Jennifer Turner at the Woodrow Wilson Center's China Environment Forum (WWC/CEF) and Kenji Otsuka at the Institute of Developing Economies, Japan External Trade Organization (IDE-JETRO). The project was titled "Crafting Japan-U.S. Water Partnerships: Promoting Sustainable River Basin Governance in China" and was generously funded by the New York office of the Japan Foundation's Center for Global Partnership (CGP). Within this project the tri-national research team members wrote research papers that were published in IDE Spot Survey No. 28 in March 2005 *Promoting Sustainable River Basin Governance: Crafting Japan-U.S. Water Partnerships in China*. Also in November 2005, a special issue of *Ajiken World Trend*—an IDE-JETRO analytical journal (in Japanese) that explores the future prospects of developing countries—featured our Japanese team members, whose papers focused on international cooperation for sustainable river basin governance in China. This report incorporates some of the research published in the IDE Spot Survey, but includes predominantly new information and updates. The Chinese and Japanese versions in this print version summarize the main points of the English text. Full translations of the English text in Chinese and Japanese are available on the China Environment Forum Web page at www.wilsoncenter.org/cef under the publication link.

Many individuals and organizations deserve our thanks for helping us create this publication. First and foremost were the research team members who enthusiastically participated in three intensive study tours on river basin governance in China, Japan, and the United States. The ten members were: Carol Collier, Kaori FUJITA, HU Kanping, Naoki KATAOKA, Reiko NAKAMURA, Richard Volk, WANG Yahua, Gary Wolff, Nanae YAMADA, YU Xiaogang. They used these study tours to design and carry out individual research papers aimed at exploring how China could pursue integrated river basin management by studying lessons from Japan and the United States in three crucial areas: river basin management institutions, financing, and public participation. Another vital member of the team was the CEF project assistant Timothy Hildebrandt who was key in conceptualizing and organizing the study tour work crucial for the success of this project. We wish also to thank Mikiyasu NAKAYAMA, who contributed a valuable research paper on China's international transboundary rivers to our first publication. Our research team also greatly benefited from insights provided by Masahisa NAKAMURA (Lake Biwa Research Institute) and Naohiro KITANO (Kyoto University) who presented and commented on the team's research at an international workshop we held 7 October 2005 in Tokyo.

During the study tours countless people sat down with our group to share their experience and insights on how to manage river basins more effectively. We therefore owe thanks (in alphabetical order) to individuals in the following organizations for assisting

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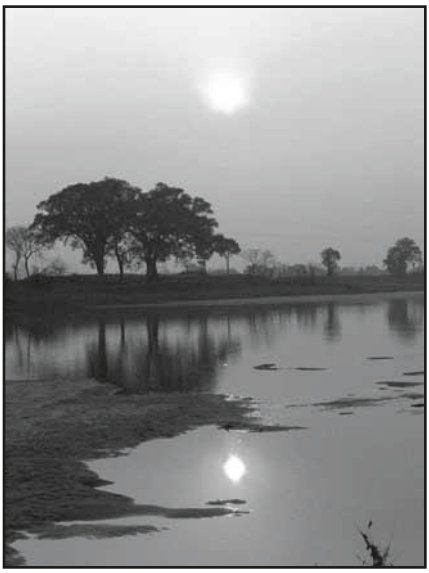
EXECUTIVE SUMMARY

China is facing numerous water crises—lakes and rivers contaminated with toxic pollutants from unregulated industries and untreated urban wastewater; severe water shortages stemming from over pumping of ground and surface water; and flood disasters caused by deforestation and destruction of wetlands. Water degradation and scarcity in China contribute to population movements, health risks, and food security problems. Water problems ultimately have the potential to affect China's social, economic, and political stability.



Ganjiang River scene
Photo Credit: Xiao Qiping

At the core of China's water challenges is the need to protect the country's river ecosystems. The need to mitigate the threats to China's rivers has catalyzed domestic and international efforts to strengthen laws, policies, and projects to promote integrated river basin management (IRBM) and more holistic pollution prevention strategies. One central strategy for implementing IRBM has been the Chinese government's attempts to reform the river basin commission system. These top-down measures are crucial for true reform in river management, but equally important will be greater empowerment of citizens and non-governmental organizations (NGOs) to participate in the decision-making and monitoring of river development and protection. A few international environmental NGOs have set up river basin protection projects in China that have brought together government agencies, communities, and Chinese NGOs to create multi-stakeholder projects to protect local rivers.

The governments and NGOs in the United States and Japan are independently undertaking some water and river protection projects in China. However, many of these projects are small-scale and short lived, which limit their ability to promote needed institutional change for true IRBM in China. In order to have a greater impact on promoting IRBM in China, the U. S. and Japan could jointly pursue initiatives in the areas of watershed management, financing, and stakeholder participation.

This report aims to present some options for the government, NGO, and research sectors in the U.S. and Japan (as well as other countries) to undertake collaborative river basin governance projects in China. To set the stage for a discussion of greater international cooperation around water in China, Part I discusses the magnitude of water problems in China. Next, Part II reviews the effectiveness of current water laws and

Sulfur and other runoff from factories—like these on the bank of Dadu River, a branch of the Yangtze—exacerbate the bigger water quality problems of erosion, sewage, and garbage in the Yangtze. Photo Credit: Yang Xin

institutions, as well as the small, yet growing indigenous NGO activity on water protection issues in China. Part III presents an overview of international aid and assistance in China to promote sustainable water management, as well as highlight the gaps in this work. The conclusion in Part IV provides some potential themes that Japanese and U.S. governments, NGOs, and research communities could pursue jointly (or in parallel projects) in China to promote sustainable river basin governance.

PART ONE:
CHINA'S RIVERS IN CRISIS

Over the past 25 years, the Chinese economic miracle has brought millions out of poverty, but at a cost to China's environment. The statistics on China's environmental problems highlight a potentially grim outlook for the country. Sixteen of the world's twenty most polluted cities are in China; China already consumes more energy (most of it low-grade coal) and emits more greenhouse gases than any country except the United States, and may surpass the United States in both categories within two decades; acid rain from coal burning affects two-thirds of the country (as well as Korea and Japan); twenty percent of the country's plant and animal species are endangered; water scarcity in the northern region has created eco-refugees fleeing farmland turned desert; and more than 75% of the rivers flowing through Chinese cities are unsuitable for drinking or fishing.[33] Even the Vice Minister of China's State Environmental Protection Administration (SEPA) Pan Yue has stated that the magnitude of China's environmental degradation—which costs the country approximately 8% of its annual GDP growth—has made the economic miracle more of a myth.[2] Among the many environmental problems, severe water scarcity, growing water pollution, and mismanagement of river ecosystems represent major threats to economic, ecological, and human health in China.

China's Water Woes

The Chinese government has been increasingly prioritizing water conservation and pollution control, however, the speed of economic growth, population pressures, and lack of law enforcement at the local level have meant progress addressing these pressing water problems has been slow. (See Box 1 for some water statistics).

Water Scarcity

China's annual per capita water supply is 25% below global average and by 2030 per capita supply is expected to fall from 2,200 cubic meters (m^3) to below 1,700 m^3, a level that meets the World Bank's definition of a water-scarce country.[3] Water scarcity is most acute in north China where per capita water resources are only 750 m^3 per year.[4] While agriculture still consumes nearly 80% of water resources in China, water consumption in industrial and domestic sectors has been rising quickly. These three thirsty sectors and lack of conservation measures are accelerating the depletion of water resources, particularly in the dry north where despite only having 24% of China's water resources, produces grains that account for more than 45% of China's GDP.[5]

Excessive water withdrawals and land degradation in northern and western China have caused desertification to advance at an annual rate of 1,300 square miles, affecting 400 million people.[6] Twenty-four thousand villages in northern and western China have been abandoned or partially depopulated due to growing desertification that has made

farming untenable.[7] This desertification also has exacerbated the spring sandstorms—100 are expected between 2000 and 2009, a marked increase over the 23 in the previous decade.[8] These sandstorms not only affect China, Korea, and Japan, but also reach the U.S. west coast.

The annual costs of water scarcity and pollution on agricultural losses range from the World Bank's high $24 billion estimate to Chinese news media quotes of $8.2 billion.[9] While most severe in the north, water scarcity has become a major obstacle to sustainable development throughout the country. Four hundred of China's 640 major cities face water shortages, which in 2003 cost $28 billion in lost industrial output.[10] In China's rural areas approximately 60 million people face challenges in getting enough water for their daily needs.[11] The growing magnitude of water scarcity is illustrated quite starkly in the Yellow River, which since the mid-1990s has grown so dry the river often does not reach the ocean for up to 200 days a year.[12]

Notably, increasing water supply through major dam and water diversion projects continues to be a cornerstone of China's response to water shortage. These huge projects—particularly dams—are costly and increasingly the target of opposition by local residents who stand to lose their land and livelihoods. Some studies estimate that more rigorous water conservation efforts could save China 100 to 200 billion cubic meters of water per year and thereby cut China's current water consumption about one quarter, obviating the need for such a large number of expensive and increasingly controversial massive dam and diversion projects.[13]

Water Pollution

Severe pollution is affecting all major rivers in China threatening human health and disrupting industrial production, as well as destroying river ecosystems. Weakly regulated industries and insufficiently coordinated management of water resources are two of the main institutional failures that are driving this severe water pollution problem in China. Since 2002, approximately 63 billion tons of wastewater flow into China's rivers each year, of which 62% are pollutants from industrial sources and 38% are poorly treated or raw sewage from municipalities.[14]

Wastewater treatment was a major priority in the Tenth Five-Year Plan (2001-2005), however, a 2004 inspection by SEPA of sewage treatment plants built since 2001 found that only half of them were actually working and the other half were closed down because local authorities considered them too expensive to operate.[15] At the end of 2002, the official municipal wastewater treatment rate was 39.9% and in rural areas these rates are much lower.[15]

Perhaps most telling of the weaknesses in protecting China's waters is the case of the Huai River, which despite a decade-long central government campaign that began in 1993, is still one of the most polluted in China. The highly polluted Huai is linked directly to high cancer rates and other serious human health impacts in the basin. For example, for many years no young men from certain villages in the Huai River Basin have been healthy enough to pass the physical examination required to join the army.[16]

BOX 1:
TRENDS OF WATER USE, SHORTAGES AND POLLUTION IN CHINA

Water Use

- Annual demand for water is expected to triple from 120 to 400 billion tons during 1995-2030.
- From 1980 to 2003 agricultural consumption (including forestry and wetlands) declined from 83.4% to 64.5%, while industrial and household consumption increased from 10.3% to 22.1%, and from 2% to 11.9%, respectively.[19]
- Between 1980 and 2000, Chinese urbanites increased per capita daily water consumption about 150 percent–from less than 100 liters in 1980 to 244 liters in 2000.[20]
- Only 43% of the water consumed in agriculture is used efficiently for irrigation, compared to 70% to 80% in developed countries.[21]
- China loses as much as 25% of the water transmitted through pipes due to leaks which is considerably higher than the 9% lost in Japan or 10% in the United States.[22]
- Groundwater comprises 30 percent of the China's total urban water supply, but due to environmental problems caused by excessive extraction (e.g., less water to dilute pollutants), only 63% of the urban areas have groundwater that is potable without treatment.[23]
- In 2002 the amount of water used for every $10,000 worth of GDP in China was 537 m^3, four times the world average and 10 to 20 times that in developed countries.[24]

Water Scarcity

- China's annual water shortage ranges from 30 to 40 billion m^3, of which the urban water shortage is 6 billion m^3.
- In 2003, floods and droughts led to economic losses of $24 billion; while desertification cost the country $6 billion.[25]
- SEPA estimates that in 2003 and 2004, water scarcity cost China $28 billion in lost industrial output.[26]
- Over the coming decades desertification could cause thirty to forty million Chinese farmers to migrate due to lack of access to arable land and water.[27]
- Water shortages in the North China Plain threaten China's goal of food self-sufficiency, for the region produces more than 50% of the nation's wheat and 33% of its maize.

Water Pollution

- Nearly 700 million Chinese lack access to safe water and consume water contaminated with animal and human waste that exceeds the maximum permissible levels for fecal coliform bacteria.[28]

(continued)

With a low wastewater treatment rates (40% nationwide) cities are a major source of pollutants flowing into China's rivers. Photo Credit: Ganjiang Guy

- Underground water in 90% of Chinese cities is polluted, which raises human health concerns since 70% of the Chinese population depends on underground water for drinking.[29]
- In 2003, industrial and domestic wastewater emissions totaled 69 billion m^3, double the 1980 level. Each year one-third of industrial wastewater and two-thirds household sewage are emitted untreated.[30]
- Over 50 percent of the length of the Hai River, one of the major rivers in northern China, has worse than level V water quality (poor).[31]
- Water pollution cost China's fisheries $130 million in 2004, an increase of over $40 million from the previous year.[32]
- Along China's major rivers—particularly the Huai, Hai, and Yellow—communities report higher than normal rates of cancer, tumors, spontaneous abortion and diminished IQs due to the high level of contaminants in the soil and water.[33]

Degraded Water Ecosystems

While pollution and over extraction are the major causes of degraded watersheds in China, many rivers—particularly the Yangtze—are equally threatened by deforestation, conversion of wetlands for agriculture, and unsuitable infrastructure projects in the flood plain, all of which have led to bigger and more damaging floods. Moreover, ill-planned hydrological projects on the Yangtze have disrupted the river's natural flow, damaging the basin's ecosystems and leading to considerable loss in biodiversity and the productivity of the river.

In addition to the environmental and economic costs of water degradation, polluted water and shortages have contributed to social unrest in China. The Western news media and nongovernmental community tend to focus on high-profile water conflict stories, such as the problems of citizens relocated for the construction of the Three Gorges Dam. However, inter-provincial disputes and lower-level conflicts are growing in number and even becoming violent. (See Box 2).

Three Core Elements of IRBM

Examination of the problems facing China's rivers opens up an opportunity to understand the country's growing water crises, as well as the political and social problems hindering effective river basin governance. While nearly all countries in the world face multiple challenges in protecting water resources, China is seriously failing to sustainably manage its water resources, particularly rivers. The detrimental impacts of uncontrolled development and insufficiently coordinated water management institutions underscore the need for China to adopt a more holistic approach to river management—specifically integrated river basin management (IRBM). Within the complex IRBM concept we believe there are three key institutions that Chinese policymakers, NGOs, and international donors should first emphasize to promote better river basin governance in China: (1) river basin management institutions, (2) financing mechanisms, and (3) public participation. Below is a short review of these three institutions in China.

Fragmented Management Institutions

Ineffective and insufficiently coordinated management to protect water resources lies at the core of China's water problems. China's first Water Law (passed in 1988) and supporting regulations mandated water conservation efforts (such as water fee collection, allocation programs, water use permits, installation of water efficient equipment). However, weak monitoring and enforcement capability at the local levels and within river basin commissions, as well as difficulties in creating clear water-use rights hinder many of these water management reforms. A core goal of the 2003 amended Water Law was to empower river basin commissions in order to improve the implementation of water conservation and management measures.

China's seven river basin commissions (RBCs) were initially created in the 1950s to exploit water resources, generate electricity, mitigate flood damage, and provide facilities for navigation. As branches the Ministry of Water Resources, RBCs possess strong technical and hydrological expertise but often lack the management capacity to

BOX 2:
WATER CONFLICTS IN CHINA

The contentious nature of managing and protecting water is aptly captured in a quote attributed to Mark Twain: Whisky is for drinkin' and water is for fightin'. While *bai-jiu* and not whisky is the firewater of choice in China, Chinese government agencies, provinces, counties, villages, and individuals do fight over access to clean water or over damages from polluted water. In recent years the Chinese government has become more transparent in revealing numbers on protests related to environmental issues.

- The director of the Policy and Regulatory Department of China's Ministry of Water Resources (MWR) Gao Erkun, reported in a July 2003 meeting that from 1990 to 2002 over 120,000 water quantity conflicts had been reported to the ministry.
- In the summer of 2005 the central government, for the first time, announced that in 2004 3.76 million Chinese, mostly disadvantaged groups, took part in 74,000 mass protests. Many of these protests are sparked by land grabs by local governments, closing factories, and increasingly, environmental pollution.[34]
- In the mid-1990s, a Central Committee of the Chinese Communist Party report acknowledged that environmental degradation and pollution represented one of the four leading causes of social unrest in the China.[35]

Citizen Protests

Environmental problems, particularly lack of access to clean water has sparked a growing number of citizen complaints and protests since 1997. In 1997, citizens sent 16,758 letters about pollution to environmental bureaus, which increased fivefold to 60,815 in 2003—noise pollution was the top complaint, with air and water pollution being the next most common complaints.[36] One long-standing water dispute began in the 1980s when villages along the Zhang River (a tributary of the Hai in northern China) undertook near guerilla warfare destroying each other's water diversion canals after a growing number of government-sponsored water diversions further upstream created a severe water shortage in the basin. Local governments in the basin have been unable to resolve these conflicts and only in the past few years has a major MWR initiative to mediate the conflicts begun to calm the situation.[37] A number of water pollution protests have emerged in the wealthy province of Zhejiang. In April 2005, 60,000 people in the village of Huaxi, Zhejiang, protested against an industrial park in which 13 chemical plants had been polluting the water and soil around the village.[38] After police began beating elderly citizens blocking the entrance to the park, farmers from surrounding villages arrived to drive the police away, two people were reported killed in the violence. The local government promised to close and move the factories, but as of August 2005 nothing had been done and villagers threatened new protests. In July, 2005, more than 10,000 people in Zhejiang province protested the toxic emissions from a pharmaceutical plant that was contaminating land and water and harming public health.[39]

Transboundary Conflicts

In terms of transboundary water issues, China's development of the upper reaches of the Mekong River causes much concern in the region. As only an observer rather than a full member of the Mekong River Commission, China is not obligated to clear the planned eight dam construction projects with downstream countries. Pollution from transboundary rivers represents another major source of tension with surrounding countries, exemplified in the major benzene spill into the Songhua River in November 2006 that impacted both Chinese and Russian cities.

Conflict Resolution in the Courts

Not all conflicts over water projects turn violent. The government, NGOs, and private law firms are making efforts to create channels for peaceful dialogue on water problems. The Chinese government acknowledges the necessity of improving water protection to prevent conflicts, as well as strengthening water conflict resolution mechanisms. Within the National Water Law there are provisions for administrative arbitration when conflicts arise between government jurisdictions. Although MWR employs 60,000 people to deal with water quantity conflicts, administrative arbitration methods do not always work because local protectionism prevents local water and environmental bureaus from enforcing judgments.[40] In the water pollution sphere, SEPA has set up a third-party mediation system within the seven major river basins to oversee water management problems and conflicts. SEPA also is currently drafting a policy to address cross-provincial water pollution disputes.

Beginning in the late 1990s private Chinese law firms began specializing in environmental cases, many of which have been class-action water pollution cases. These private lawyers have been winning cases for pollution victims by moving cases to courtrooms outside the influence of the local government where the water conflict took place.[41] In January 2005 a landmark settlement over water pollution took place in Inner Mongolia, when two Chinese paper mills and a local water-treatment bureau agreed to pay $285,000 to the Baotou City Water Supply Company. In 2004 polluted wastewater from the two paper mills forced the water supply company to stop using water from the Yellow River for five days, which led to over $300,000 in economic losses for the company.[42] This case highlights how Chinese courts could potentially become an effective tool for pollution victims to use to gain justice and compensation.

Since the mid-1990s, Chinese journalists have been quick to report on water pollution and other incidents of environmental degradation, giving the news media a growing role in channeling information on environmental threats to the public and checking polluters. (Photo Credit: China Environment News)

monitor and enforce water protection and conservation measures. Generally, Chinese RBCs do not focus enough on the ecological health of rivers or sufficiently address ways of balancing upstream and downstream water needs. The effectiveness of river commissions is also limited due to poor (and sometimes even adversarial) relationships with other government agencies, as well as provincial and local governments. Another major shortcoming of Chinese RBCs is that they fail to incorporate broad stakeholder input in basin management efforts.

Limited Financing Tools

In river management planning and projects to divert water resources, river basin commissions and other government agencies do not sufficiently consider economic, social, and environmental costs. Although the central government sets lofty river and water clean up goals in campaigns and in five-year plans, the funding often falls short of what local governments need. For example, the ten-year Huai River campaign had little impact on the river. Moreover, although there were numerous water clean up targets in the Tenth Five-Year Plan, the government fell 30% short on its funding for environmental goals in the plan.[17]

Instead of depending on central government subsidies, China needs to provide economic incentives for industries and local governments to protect river ecosystems, particularly downstream users compensating upstream protection measures. Chinese RBCs and cities lack financing mechanisms such as revolving funds and bonds, which could fund the construction of sorely needed wastewater treatment facilities. A major obstacle to such mechanisms is the low rate and low collection levels of water fees. Market tools such as green taxes, water trading, and upstream-downstream compensation strategies, which could promote conservation of river resources have been slow to develop in China.

Lack of Transparency and Public Consultation in Water Policy Decision-making

At both central and local levels, governments do not inform and consult with citizens about proposed development projects and water resource management initiatives. Thus public participation in the water policy sphere is generally limited to complaints and protests. Chinese citizens are allowed to make formal complaints to the government on damages from pollution and to sue polluters (and recently even government agencies), however these efforts do not always effect change. Greater citizen and NGO involvement in monitoring water policies and projects holds promise of improvements in protecting China's river basins.

Potential of a U.S.-Japan Water Partnership in China

The economic reforms in China that have brought rapid industrialization, raised standards of living, and freed many rural people from agricultural work have produced declining environmental conditions that directly impact the health of the Chinese people and their economy. The need to build U.S., Japanese, and Chinese environmental partnerships on multiple levels is particularly crucial as China's integration into the world economy speeds up both economic growth and environmental degradation. Although China's water challenges are severe, they do hold many opportunities for U.S.-Japan assistance in the areas of watershed management, financing, and stakeholder participation.

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PART TWO:
DOMESTIC INITIATIVES ON RIVER BASIN PROTECTION

The difficulties in effectively addressing the growing water scarcity and pollution problems have led the Chinese government to adopt new (and update old) laws addressing water management and pollution problems, as well as reform the river basin commission system. Water protection also has become a priority investment area in the two most recent five-year plans, for sustainable water supplies are crucial to fuel economic growth. These top-down measures are critical for reforming the water management laws and institutions and improving the water pollution prevention infrastructure. Equally important will be for the government to continue expanding the political space for bottom-up citizen and nongovernmental organization (NGO) involvement in the water sector. Below we first briefly introduce the scope and impact of the Chinese government's investments, laws and institutions to manage and protect the country's endangered water resources. We then highlight some openings for public participation in protecting water resources, particularly NGO activities.

Top-Down Initiatives Addressing China's Water Woes

High-Level Prioritization

Under the Tenth Five-Year Plan (FYP, 2001-2005), the government set admirable environmental protection targets—particularly around water—but fell short by 30% of the promised $85 million investment. Under the Tenth FYP, the government aimed to construct or expand 145 urban wastewater treatment plants in the basins of the Huai, Hai, and Liao rivers and the Tai, Chao and Dianchi lakes. In addition, urban sewage treatment rates were supposed to reach 50 percent.[1] Although the Chinese government made progress in increasing the rates of industrial and municipal wastewater treatment, a SEPA inspection of sewage treatment plants built during the Tenth FYP revealed only half of were actually in operation.[2]

During this FYP period the government did continue enforcement of a logging ban in southwest China, as well as investment into a program to encourage the conversion of cropland to forests on sloped fields. Both these programs have helped alleviate the serious erosion that exacerbated the 1998 flooding of the Yangtze River.[3] In late 2005, SEPA announced that water pollution control efforts in China have led to some improvement of water quality.[4] However, such claims may overstate the progress. For example, during the ten-year campaign to clean up the Huai River, SEPA reported great improvements in water quality, but at the conclusion of the campaign was forced to admit the river was (and remains today) severely polluted. One high-level Chinese water expert stated that it was impossible for the Tenth FYP goals of cleaning up the Huai River to be met by the end of 2005.[5]

The Chinese Communist Party issued their proposal for the Eleventh FYP (2006-2010) in early October 2005 and the final plan will be approved the by National People's Congress in March 2006. The current draft contains statements expressing very holistic principles of protecting the natural ecosystems and conserving energy. One part of the plan notably calls for environmental policies to be made to protect wetlands and repair damaged ecosystems along China's coastlines. The FYP also includes exhortations to intensify pollution control in three key rivers (Huai, Hai, and Liao) and three major lakes (Tai, Chao, and Dianchi), as well as the Three Gorges Dam area and the upper reaches of the Yangtze and Yellow rivers. The plan also prioritizes pollution control along the route of the South-North Water Transfer project.[6] Under the plan SEPA aims to raise the urban wastewater treatment rate from the current 45 percent to 60 percent in all cities.[7] Former SEPA Minister Xie Zhenhua noted that total investment in environmental protection during the Eleventh FYP is aimed to reach over 1,300 billion Yuan ($156.6 billion), more than 1.5 percent of the country's GDP.[8]

Water Quantity Management in China

Although China has formulated a fairly comprehensive array of water protection laws, major institutional problems are hindering effective management of water resources, particularly rivers. One core challenge to water quantity management is the lack of a clear water rights system, for water belongs to the state and has therefore been treated as an open access resource. Unclear water rights have discouraged conservation, as well as water trading, which could allow water to be transferred without conflict between sectors (particularly from agriculture to industry).

The competition among various bureaucracies to control water resources in China—often referred to as the many-headed dragon (*Duo Longtou*)—is the other major institutional driver of poorly integrated management of water. The main combatants in controlling water are the Ministry of Water Resources (MWR, responsible for water quantity issues) and the State Environmental Protection Administration (SEPA, responsible for overseeing water pollution control). While the ministries of agriculture and construction and the Bureau of Fisheries also lay claim to various aspects of water management, overall MWR possesses the most power to make decisions over water quantity and river basin management throughout China. Notably, as China's political system has been decentralizing over the past 25 years, in the area of water the central government has been re-centralizing control of rivers under MWR and its seven major river basin commissions.

China passed its first National Water Law in 1988, which attempted to clarify authority over the management of water and create the framework for some water conservation institutions to better define water rights. For example, the law included: (1) a requirement for increasing water fees; (2) a water withdrawal permit system to assign water user rights to industries, farms, and cities, which in turn will enable local governments to collect more water fees; and (3) a water runoff allocation scheme to divide water rights among provinces in watersheds under stress.[9]

Local governments have been major hindrances to the long-overdue fee and permit reforms due to fears that limiting water use will hurt the local economy. However, in recent years a number of major cities have begun to increase water fees and install more water

meters, which are key changes needed to slow the dangerous overdrawing of surface and groundwater resources. Nevertheless, when cities lack water they usually opt to tap new supplies rather than strictly enforce fee, permit, or other conservation policies. Beijing municipality pursues this supply side management to quench the capital's growing thirst.[10]

One very positive trend to improve water management at the local level has been the creation of municipal Water Resource Bureaus in a handful of cities. This new bureau brings together local environmental, water, and construction bureaus to jointly manage water resources—a local innovation trying to deal with the many-headed dragon problem. Another promising, albeit not yet legal, development coming from the local areas has been experiments in trading water between counties or between industrial and agricultural users. The first water trade took place in Zhejiang province in 2000 when Yiwu county bought permanent water use rights for 50 million m^3 per year of reservoir water from the upriver Dongyang county.[11]

By the mid-1990s, after considerable pressure and effort by MWR and its local water bureaus, the permits for water withdrawals were issued in many regions, but the amounts permitted often did not push much needed water conservation and were not always well enforced. The water allocation scheme that has been introduced in few basins also was not completely successful because: (1) MWR and provincial governments did not create enforcement institutions, and (2) river basin organizations lacked sufficient clout and ability to coordinate and monitor such water allocations.[12]

The 2002 amendment of the Water Law aimed to remedy some of the shortcomings of the previous law and address the growing water shortages by requiring river basin commissions (RBCs) to allocate water among all the provinces within the basin following a total amount control strategy (e.g., viewing river water holistically and reserving some water for ecological flows). A strictly enforced allocation system is meant to push local governments to monitor and enforce water withdrawal permits and prioritize water conservation. Managing basin-wide allocation schemes is difficult logistically and politically, which is why among the seven major RBCs only the largest and most powerful one—the Yellow River Conservancy Commission (YRCC)—has formulated and implemented a fairly successful runoff allocation scheme.

Challenges to Water Quality Management

In 1984 the Water Pollution Prevention Law (WPPL) was passed and revised in 1996. This law states that environmental protection bureaus at each level of government are empowered to manage and monitor inspections to prevent water pollution. Despite possessing the legal authority to regulate pollution, local protectionism of industry has prevented environmental protection bureaus (EPBs) from effectively using WPPL to prevent water pollution. For example, although pollution charges are low the local governments will often return up to 80 percent of the charges back to the polluting industries.[13] Local officials frequently turn a blind eye to illegal discharges of pollutants from an industrial firm that pays a large amount of tax to the local government coffers.

Some inconsistent stipulations in the WPPL and Water Law have aggravated interministerial conflicts and thereby complicated efficient implementation of water quality planning, protection, and monitoring.[14] Although SEPA regulates water quality through

BOX 3:
CHINESE ENVIRONMENTAL NGOS ENGAGED IN WATER RESOURCE PROTECTION

Ganjiang Environmental Association (Jiangxi Province)

Over the past decade many highly polluting industries have relocated to Jiangxi province, which has caused the water quality of the Gan River (Ganjiang) to dramatically deteriorate. Cancer rates along the Ganjiang appear to be increasing as well. In response to this rapid degradation of the river, in 2003 concerned citizens and environmental experts created the Ganjiang Environmental Association. Led by Xiao Qiping with a four-member staff, the association has been: (1) conducting water quality research, (2) producing publications on water resource protection, (3) sponsoring photo exhibitions and lectures at schools, and (4) shooting a documentary on environmental protection needs in the basin. Beginning in July 2003 members of the association began taking motorbike trips to survey the pollution problems in the middle reaches of Ganjiang, compiling 15-hours of video footage and thousands of pictures. Local and national news media have used some of these photos to publicize the river's pollution problems and the association's work, which has helped this NGO gain greater influence. Since 2003, the association's monitoring of the river has uncovered pollution violations by enterprises in four townships in the basin (Taihe, Futan, Xiajiang, and Fengning).

Green Hanjiang (Hubei Province)

Green Hanjiang registered in September 2002 in Hubei province and is the first environmental group working on the Han River (Hanjiang). This NGO aims to promote environmentally friendly development around the Hanjiang through public education and information dissemination. Green Hanjiang's main activities include doing research on environmental hotspots around Hanjiang, communicating public concerns to local government agencies, acting as a watchdog against local pollution, and educating rural residents on the importance of sustainable development. This NGO also has advocated for greater compensation for citizens who will be displaced by the construction of the South-North Water Transfer project.

Green River (Sichuan Province)

Green River was created by nature photographer Yang Xin, who wished to better inform policymakers on how to protect the fragile headwaters of the Yangtze River by promoting better science and study of the region. The Sichuan-based Green River has worked since 1994 to protect the ecologically fragile Yangtze headwaters region through activities at two ecological research centers. Core Green River projects include: (1) cooperation with local scientific research organizations and journalists to survey and research the quality of the Yangtze River headwaters in order to accumulate baseline data on the health of the river and to help design an effective environmental protection plan for the upper basin; and (2) recruitment of volunteers to educate local rural communities and tourists about

the threats to the Yangtze River ecosystem. In a new initiative, Green River is developing a program to help promote ecologically sustainable tourism in one Tibetan village in the Minjiang Basin (a tributary of the Yangtze). Besides educating villagers on ecotourism and environmental protection, in 2006 Green River will build some waterless toilets and an ecologically friendly solid waste treatment facility in one village.

Green Watershed (Yunnan Province)

Green Watershed is an NGO focusing on integrated watershed management in the Lancang-Mekong River Basin in Yunnan province. Founded in 2002, the mission of Green Watershed is to provide the requisite knowledge, technology, and decision-making methods to support participatory watershed management in southwest China. With the assistance of Oxfam-America, Green Watershed established—and now facilitates—the Lashi Watershed Management Committee. This committee runs dialogues among a broad range of government and community stakeholders to help them evaluate watershed development and protection options. In order to promote broader multi-stakeholder participation in the decision-making surrounding dams in southwest China, Green Watershed set up some exchanges bringing villagers from the Nujiang basin to visit to villages at the Manwan and Xiaowan Dams. This village-to-village visit enabled the Nujiang basin villagers to see first-hand the potential detrimental effects of dam building on remote rural communities. After the exchanges, Green Watershed gave these villagers an opportunity to voice their opinions to the public through the news media. Such reports allowed grassroots voices to be heard in the Nujiang dam decision-making.

Huai River Protectors (Henan Province)

Huo Daishan, the founder of this NGO (registered in 2003 at the bureau of civil affairs in Shenqiu county, Zhoukou city, in Henan province), is a photographer and journalist who has used photo exhibitions to help promote information on the severity of human health and ecological damage stemming from the extremely polluted Huai River. Mr. Huo also has conducted health surveys of villagers in the river basin and discovered abnormally high cancer rates, which appear to be caused by the water pollution in the rivers. His numerous health surveys along the polluted river and canals estimated over 100 villages have abnormally high rates of cancer patients. Huo also has used some funding from small private foundations to send water filtration equipment and medicine to some villages. CCTV and other news media organs have reported on his health surveys and assistance activities in these cancer villages. Such news reports have pushed local governments to invest into drilling deep wells to supply safe and clean water for villagers.

the Environmental Protection Control Act (1989) and WPPL, the Water Law authorizes MWR to oversee China's "water resource management," which has led MWR to view water quality protection as one of its responsibilities. Thus, there exists a contentious political struggle between SEPA and MWR over regulating water pollution.[15]

One major problem stemming from this struggle is that SEPA and MWR compete in collecting data on water quality and in regulating water pollution, which creates costly redundancies and severe lack of coordination in water clean up. Similar to the water quantity problems, the unwillingness of local governments to enforce water pollution laws and the weakness of the center to pressure them has led to a phenomenal growth in degraded watersheds.[16] The National People's Congress will finish revisions of the WPPL in early 2006, which will include provisions to strengthen enforcement and to clarify responsibility for regulating water pollution.

Obstacles to Integrated River Basin Management

While the 2002 reforms have on paper greatly increased the power of RBCs, these institutions need more reforms and capacity building to be fully capable of implementing integrated river basin management (IRBM). China's RBCs are merely extensions of the MWR and take a very top-down and narrow approach to manage the river basin. Besides lacking complete authority over water quality issues, China's RBCs do not have institutions to allow for local government or citizen input. In fact, the name river basin conservancy commission (*liuyu weiyuan hui*) is a misnomer, for China's RBCs have neither commissioners nor any official mechanism for provincial or local governments to shape polices or allocations in these top-down structures of river management.

Lacking a formal seat at the table has led provinces to undertake considerable backroom bargaining that ultimately hinders effective management of the rivers. For example, in 2002 the Yellow River flow barely made it to the ocean, which meant the furthest downstream province Shandong faced a severe water shortage that threatened the fall harvest. The Shandong government sent a delegation to Beijing that successfully lobbied for water to be released from reservoirs in Inner Mongolia, which caused water shortage and hardships upstream.[17] Such *ad hoc* decision-making to solve water problems ultimately causes more conflicts and does little to push forward water conservation or ecosystem protection.

New EIA Law

Over the past few years SEPA has been advocating increased public participation as another method for promoting better protection of natural resources and human health. The rights of the public to influence environmental policy formulation and implementation were vaguely guaranteed in China's first Environmental Protection Law in 1979. However, citizens' rights to influence environmental laws and infrastructure projects have only begun to be clarified and strengthened since the passage of recent legislation such as the 2003 Environmental Impact Assessment (EIA) Law. The first EIA Draft Law passed in the mid-1990s applied only to construction projects, but this new law requires evaluation of the plans for infrastructure and other construction. Notably, EIA reports must now be published and available for public comment.[18]

This new EIA Law already has empowered SEPA to exercise its muscle to protect the environment. For example, in January 2005 SEPA temporarily suspended 30 large construction projects across the country—many of which were dam and other water infrastructure projects that had neglected to develop proper EIA reports. Most of the suspended projects were quite large, including the Xiluodu hydropower plant along the Jinsha River in the upper reaches of the Yangtze River.[19]

Pan Yue, the outspoken Vice-Minister of SEPA, noted that this first "victory" in suspending particularly damaging factory and infrastructure projects does not mean SEPA has the capacity to comprehensively check all such projects. Pan stressed that public participation in the EIA process is also needed. He noted that SEPA intends to hold public hearings and forums so the public can get more involved in the EIA process.[20] Because SEPA and EPBs currently lack clear procedures to conduct outreach and hold such hearings, some international NGOs, such as the American Bar Association, have been holding trainings on how to carry out such hearings and other public outreach mechanisms. Moreover, the Japanese International Cooperation Agency (JICA) is assisting SEPA in drafting implementation guidelines for public participation in EIAs. The Chinese government is not only welcoming international groups to help in improving environmental protection regulations and projects, but also is increasingly open to domestic NGOs working conservation and environmental education on issues.

Bottom-Up Initiatives to Address China's Water Woes

The Missing Piece—Public Participation in Water Protection and River Basin Governance

On 13 November 2005, an explosion occurred at a PetroChina chemical plant in Jilin province that released over a hundred tons of benzene into the Songhua River. The Songhua flows into Heilongjiang province where it supplies drinking water for the provincial capital of Harbin and another 600 kilometers downstream it is the main water supply for the Russian city of Khabarovsk. For several days provincial and local officials in Jilin hesitated to inform downstream governments or SEPA about the spill. Once informed, Harbin officials also tried to cover up the crisis, first by telling city residents ten days after the spill that the water supply system would be cut off for "routine maintenance." However, in the face of growing rumors of a major chemical spill municipal officials quickly revised their announcement stating that the water system would be shut down for four days to prevent citizen exposure to benzene.[21] Many citizens fled the city, for few had confidence that the local officials could be trusted in providing accurate information on the health risks of the benzene.

The Chinese news media initially was quick and sharp in its criticism of the inadequate local response to the crisis, but toned down the negative reporting after a few days to highlight the efforts of the central government (which included investigations and disciplining of local officials).[22] The Minister of SEPA, Xie Zhenhua, was asked to resign in light of what was perceived as SEPA's initial inadequate response to the crisis. This case, exemplifies local protectionism of industry, shortcomings in emergency

preparedness, and insufficient government transparency, as well as a pervasive lack of mechanisms for informing and involving the public in environmental protection issues.

Environmental NGOs Take the Stage

The move to increase the public's role in the environmental policymaking sphere in China began in 1994 under new administrative regulations that permitted the registration of "social organizations" (e.g., NGOs). The central leaders permitted this political opening to civil society because they knew the government needed broader help from citizens in addressing the growing social and environmental ills produced by rapid economic growth and the dismantling of the social welfare system. Admittedly, this political opening still has limits, for the registration regulations remain fairly restrictive in that they require all Chinese NGOs to obtain a government sponsor (referred to as *popo* or mother-in-law) and does not permit them to open branch offices. Another legal obstacle to limit the numbers of NGOs is the provision that no two groups can pursue the same kind of work within the same city or province.[23]

In 1994, the first environmental grassroots group to register under the new regulations was Friends of Nature, an environmental NGO. Other green groups also sought registration and those that failed often registered as businesses or operated without formal status. An increasing number of green groups have been established as solely Internet groups, thereby bypassing the registration system all together.[24] Today environmental NGOs number nearly 2,000 in China and have become the vanguard of civil society development. Initially, Chinese environmental NGOs tended to pursue "safe" activities such as promoting environmental education for schools and informing the general public on issues such as recycling, water conservation, and animal protection.

Despite registration challenges and the pressures to be non-confrontational, by the late 1990s a number of groups began increasing their area of operation—both geographically and thematically—which greatly enhanced their policy influence. While most Chinese green NGOs operate in urban areas or focus on biodiversity hotspots in Sichuan and Yunnan provinces, a handful of Chinese NGOs have been effectively working on water issues—particularly concerning river protection and public participation.

NGOs Diving into Water Work

While still few in number, some Chinese NGOs have been working on watershed and river protection initiatives, most of which include a strong public participation component. (See Box 3). One unique Chinese NGO with a broader focus—the Center for Legal Assistance for Pollution Victims (CLAPV)—has been playing a key role in helping victims of water pollution. Although the 1979 Environmental Protection Act (revised in 1989) granted pollution victims the right to sue in cases of damage, in practice it is challenging for citizens to navigate their way through the courts, which are often pressured by local governments to protect local industries. Over the past few years, private lawyers have been helping victims of major water pollution incidents win their cases. Like CLAPV, these lawyers are setting legal precedence and pushing the courts to build up their capacity in dealing with such cases, which often demands special expertise from the judges.[25]

The beginning of a dam on the first bend of the Yangtze (Jinsha section) is arousing considerable attention since it is being built on the main trunk of the river rather than tributaries. This dam will be the first of a planned 12-dam cascade on the entire Jinsha section, ending at the Tiger Leaping Gorge. These planned dams in the upper reaches of the Yangtze are prioritized not only to generate hydroelectric power, but also to prevent the Three Gorges Dam reservoir from becoming over-silted. (Photo Credit Ma Jun)

A major watershed in the development of Chinese environmental NGOs took place in 2004 and 2005 when environmental activists and journalists built up a national campaign to push for more transparency in the construction of a series of 13 hydroelectric dams in Yunnan province on the Nu River (Nujiang)—one of two remaining wild rivers in China. In the fall of 2004, some Chinese environmental activists learned about the Yunnan provincial government's plans to construct these dams on the Nujiang, which led them to arrange for some journalists to tour the basin to investigate the dam plans and potential impact on the area.[26]

After the first group of journalists who traveled to Nujiang began reporting on the beauty of the area, which is notably a World Heritage Site, other journalists flocked to the basin. Within weeks hundreds of news stories and broadcasts across China were condemning the planned dams and the lack of transparency in their planning—they had not undergone the required environmental impact assessment (EIA). Environmental NGOs created a network organization called China Rivers Network to coordinate their joint work setting up photos exhibitions around the country to highlight the beauty of this endangered river to the public and to send petitions to central leaders.[27]

This extensive public debate caught the attention of Premier Wen Jiabao, who in February 2005 ordered the planning of the dams suspended pending an EIA. In August 2005, a broad coalition of Chinese groups (which included 61 NGOs and 99 researchers and government officials) sent an open letter to the top leaders urging public disclosure

of the EIA for the hydropower development plan on the Nujiang before the government approves any dams on this free–flowing river.[28]

As this report was completed, the debate on the dams was still ongoing. Even if the dams do begin construction the campaign represents a major victory for Chinese environmentalists, who in partnership with journalists brought this issue into an open debate. The campaign, which was built on a decade of steady development of NGOs working with (or generally not against) the Chinese government, is also a testament to the increased freedoms Chinese environmentalists have come to enjoy. It should be stressed that NGO activities around the Nujiang are not "anti-dam" campaigns, rather a broader push for more transparency and citizen participation in water management and environmental policymaking in China.

Bringing Together Top-Down and Bottom-Up Water Work

All nations struggle with implementing water protection laws, but China's obstacles are particularly challenging—population pressures, rapid economic growth, bureaucratic infighting, unclear water rights, and local government protectionism. The Chinese government has established a strong foundation of laws and regulations to prevent water pollution and strengthen water conservation laws. Moreover, the government has forged partnerships with multilateral organizations and international NGOs to help address water management and river protection challenges.

Besides inviting international expertise, the Chinese leadership has permitted considerable political space for Chinese environmental NGOs to expand, for they know the government cannot solve environmental (particularly water) problems solely from the top-down. Over the past few years SEPA officials have been emphasizing the need to increase the public's role in shaping environmental laws and monitoring local governments and industry, for such bottom-up participation ultimately will decrease the government's regulatory and fiscal burden in enforcing environmental regulations. In July 2004, the State Council passed the Administration Permission Law (1 July 2004), which requires administrative agencies to inform citizens that they have a right to express their opinions at a hearing regarding any government project that impacts them.[29] SEPA was notably the first agency in China to write regulations and actually hold public hearings based on this new law.

Another sign of increasing transparency in the environmental sphere occurred in the fall of 2005 when SEPA circulated for comment a draft regulation that aimed to improve public participation in the EIA process. This new regulation contains stipulations on protecting participants' rights, disclosing information, and designing new procedures for public involvement. This solicitation for comments represents the first time any Chinese government agency has openly called for public input on a new regulation.[30]

A similar push for more openness in environmental information occurred in November 2005 when SEPA made a call for nationwide implementation of corporate environmental performance rating and disclosure.[31] In December 2005, the State Council included a provision in its *Decision on Environmental Protection* that requires industries to "publicly disclose their environmental information."[32]

Against this backdrop of positive trends of openness towards public disclosure of information, NGO development, and public participation in the environmental sphere,

the government has become somewhat concerned of what is perceived as too much social activism in China. This wariness stems from the growing number of protests throughout China on a whole range of issues.[33] Local governments have been particularly sensitive to NGOs monitoring polluting factories.[34] However, some municipal governments such as Shenzhen, Beijing, and Xiamen have been very welcoming of NGO and citizen involvement in the environmental sphere. More international projects to help stress the utility of public participation in helping the government reach its water protection goals could help mitigate concerns about social activism. While green NGOs in China face some external constraints, they also are hampered by some internal shortcomings that threaten their sustainability in the long run—overdependence on foreign assistance, lack of internal transparency, and high turnover in staff due to low paying positions.

In order for the Chinese government to move forward in strengthening water pollution and management laws, it will need not only to continue reforming the river basin commissions and laws from the top down, but also pushing reforms to promote stronger environmental NGO development and citizen participation. Some needed reforms include: (1) revising the rules to make registration more accessible to NGOs; (2) pushing forward tax-free donation regulations to encourage Chinese businesses and citizens to give to local NGOs, thereby breaking NGO dependence on international organizations; and (3) significantly increasing the access of the public and NGOs to information of environmental decision making (e.g., new EIA Law) and project implementation.

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PART THREE:
FLOW OF INTERNATIONAL AID TO PROTECT CHINA'S RIVERS

Over the past twenty years, many international organizations have worked with the State Council, National People's Congress, State Environmental Protection Administration (SEPA), MWR, and other ministries to develop new environmental policies, regulations, and pilot projects. The increasing health threats and conflicts arising from water pollution and scarcity in the 1990s led the Chinese government to request more international assistance in this sector. Below we provide an overview of international projects in the area of water and river protection in China. Although international initiatives in this sector are growing, there exist many more opportunities for such work in China—an issue highlighted in Part IV.

International River Basin Initiatives in China

Multilateral Aid

World Bank. China is the World Bank's largest recipient of loans and grants in the environmental sphere across a broad range of sectors—air pollution control, grassland protection, information disclosure, and water resource protection. The World Bank has been involved in numerous water protection projects including two notable initiatives aimed directly at improving the capacity of river basin governance institutions in the Tarim and Hai river basins.

Tarim River Basin. In Xinjiang, the World Bank undertook a challenging project to create a new river basin commission for the Tarim River. This project has established China's first truly "participatory" river basin management commission. Although it would be difficult to translate this experience to a larger basin with many more stakeholders, it could be useful for other international organizations to do similar projects on other small river basins to build up more support for such institutions within the Chinese government sphere.

Hai River Basin. In 2004, with $17 million in Global Environment Facility (GEF) grant money, the World Bank began a project on the Hai River Basin that aims to accelerate the integration of water and environmental management in the basin. The main challenge of this project is bringing together SEPA and MWR to jointly undertake the institutional reforms necessary to establish mechanisms for local water and environment bureaus to truly work together. The project also aims to improve the technologies to undertake integrated water planning.

Asian Development Bank.[1] Since 1986, China has been the second largest member of the Asian Development Bank (ADB) and one of its best performing portfolios. The environmental projects supported by ADB cover a broad range of issues—energy efficiency development (including renewables), urban environmental protection, and water management reforms. Water-focused initiatives have had a strong focus on municipal water management (both wastewater and water supply), as well as wetland protection (Sanjiang Plain) and river basin pollution control (Hai River). Beginning in 2003 ADB initiated a major study on the Yellow River titled the Trans-jurisdictional Environmental Management project. This study is cross-sectoral focusing on legal, financing, management, and social challenges to protect the Yellow River. The first phase of the project examined water management laws and practices at both the national and local levels. The study also evaluated mechanisms for intergovernmental relations in the basin, particularly surrounding trans-jurisdictional water pollution conflicts. This first phase offered recommendations to the Chinese government on revising current laws, as well as creating new legislation and cooperative mechanisms (e.g., a joint-ministerial committee) to promote better coordination between agencies and monitoring systems on the basin. The second phase of this project includes analysis on improving the financing of river protection focusing on the Wei River, a tributary of the Yellow River. This financing study aims to prepare specific recommendations for China's State Council on the management and financing of water control projects. Many existing water control laws are too broad and general. Therefore, this extensive ADB research initiative aims to provide a detailed technical background to better prepare MWR, SEPA, and other central agencies to reform laws to better protect China's rivers.[2]

Bilateral Aid

The United Kingdom's Department for International Development. The UK Department for International Development (DFID) focuses on poverty reduction through partnerships with developing country governments. In China, DFID's water work focuses on improved livelihoods and health through better water management and sustainable access to safe water and sanitation. DFID, in partnership with other international agencies, is supporting the Chinese government in implementing programs supporting water sector reforms proposed in the 2003 revision of the Chinese Water Law, including: increased user participation, more integrated approaches to water resource management, new approaches to soil and water conservation, and increased access to drinking water and sanitation.

The European Union.[3] Between 2002-2006 the European Union (EU) budgeted EUR 250 million for collaborative projects with China, 30 percent of which was devoted to initiatives to promote environmental protection and sustainable development.[4] One of the largest environmental projects focuses on the Liao River Basin in Liaoning province. Poor regulation of heavy industries and agricultural runoff has made the Liao one of the most polluted rivers in China. Over-extraction of Liao water has created a severe water shortage that has left Liaoning province with 603 cubic meters (m^3) of water per

person compared with the national average of 2,292 m^3. For over five years the EU office in Beijing—with support from the EU, Japan, and the World Bank—has been working with the Liaoning provincial government to create and implement a broad range of projects promoting sustainable river basin management in this highly stressed basin. The EU and their Chinese partners are working to create an integrated framework for pollution control and water resource management by: (1) setting up pilot catchment water quality protection plans for one of the main reservoirs (Dahuofang Reservoir); (2) undertaking investigations of industrial water conservation and pollution; and (3) developing water quality models for the entire basin using GIS and decision analysis software. These project activities already have enabled the EU team to make basin-wide recommendations on reforming water sector institutions and tariffs, which were adopted into the Tenth Five-Year Plan of Liaoning province.

Swedish International Development Cooperation Agency. Over the past several years Sida—the Swedish International Development Cooperation Agency—has been supporting a number of water-related cooperation projects in the following areas: (1) more water efficient technologies in industry, (2) preparation of a comprehensive action plan for the restoration of a lake in Inner Mongolia, (3) water efficiency in agriculture, (4) capacity building for better management of wastewater treatment plants, and (5) development of an ecologic sanitation system. Sida is one of the main financiers of the China Council for International Cooperation on Environment and Development (see below). Within the council water resource management is one key work area. Sida also provides concessionary credits for construction of wastewater treatment plants in China. Sweden's new cooperation strategy for China (2006-2010) will continue to prioritize environmentally sustainable development.

Switzerland's Bilateral Aid. In 2005, most of Switzerland's environmental bilateral aid focused on research and projects in Sichuan province. In 2005, Swiss researchers and Chinese counterparts conducted research, training, and demonstration projects on ecotourism, which included protective tourism development of World Heritage sites and Shangri-La Mountain, as well as eco-agricultural tourism on Longquan and Sancha lakes. In 2006 Switzerland's work in Sichuan province will include studies on water and environmental management in the Min and Tuo river drainage areas. These studies will examine management and policy options for preventing water pollution from the industrial, urban, and rural sectors in the drainage area. Another water-related study will be conducted in 2007 on the construction of ecological defense in the upper reaches of the Yangtze River. These studies will focus on restoration of forest ecosystems through sustainable ecological forestry in the upper basin, which will help prevent erosion and serious floods in the Yangtze.

China Council for International Cooperation on Environment and Development.[5] The China Council for International Cooperation on Environment and Development (CCICED) is a high-level consultative body made up of both international and Chinese experts and officials who provide strategic consultation to China's State Council con-

Instead of properly processing wastewater a paper mill in the middle reaches of the Ganjiang built a fence to catch foamy emissions so they can be diluted before being released into the river. (Photo Credit: Xiao Qiping)

cerning environment and development issues. In March 2003, the council launched a task force on integrated river basin management (IRBM), focusing on the Yellow River. The overall objective of this task force, which includes considerable NGO participation, was to promote healthy river basins in China through better governance of water resources, biodiversity conservation, and ecosystem management through information sharing, demonstration, and public participation. In addition to gathering information on how IRBM is implemented around the world, the IRBM task force worked with WWF-China on studies in the Yangtze River to create a basin conservation plan.[6] The ideas in this plan have been shared with local and central government agencies, as well as community groups to solicit input for the final version they will present to CCICED with the hope of informing future legislation and pilot projects.[7]

Japanese Government's Water Work in China

Since the mid-1990s, a very significant share of all Japanese ODA for China has been for environmental projects. A large number of these projects focus on water, particularly wastewater treatment, water supply facilities, water conservation in large-scale irrigation districts, and river basin improvement. In 2004, the Japanese government announced it will prioritize water resource management and conservation in China through afforestation, anti-desertification, and watershed management. Moreover, Japan will build on previous bilateral assistance in China to address problems of water pollution and ecosystem conservation. The Japanese government's ODA contribution to environmental protection in China has been predominantly Yen loans for infrastructure. However, the Japanese government agencies are discussing with their Chinese counterparts the possibility of terminating Yen loan projects to China by 2008, which coincides with the year

Beijing is hosting the Olympics. If Yen loans are terminated, Japanese ODA to China is expected to focus more on assistance to institutional reform and human resource development issues, rather than infrastructure projects.

Japan Bank for International Cooperation. In China, Japan Bank for International Cooperation (JBIC), which supplies Yen loans to many developing countries, focuses on three target areas: environment, human resource development, and poverty alleviation in the western region. Since 1979, JBIC (previously called OECF) has made significant loan commitments to China, over the last five years JBIC loans have averaged $1.5 billion a year.[8] JBIC does not have specific projects to support river basin management, but is involved in many water-related projects such as: (1) water supply projects in more than 20 large cities in China; (2) water pollution control projects supporting industrial wastewater treatment and sewage plant construction and their expansion in rivers basins in five provinces—Huai River (Henan), Songhua-Liao River (Jilin), Songhua River (Heilongjiang), Xiangjiang River (Hunan), and the upper Sanxia Dam River (Chongqing City); (3) water saving irrigation in Xinjiang and Gansu; (4) afforestation on the Loess Plateau (in Shaanxi, Shanxi, and Inner Mongolia), in which one central goal is to greatly reduce siltation of the Yellow River; (5) afforestation in Hubei and Jiangxi provinces in the middle part of Yangtze River; and (6) multipurpose dams for flood control and water supply in Sichuan, Henan, and other provinces.

Japan International Cooperation Agency. Japan International Cooperation Agency (JICA) projects related to water include a technical cooperation project in which Japanese experts are dispatched to train counterparts from China or Chinese experts are invited to Japan for training in areas such as: (1) human resource development for a water resources project, in which JICA aims to train more than 2,000 central and local government water bureau personnel; (2) model planning project for water-saving measures in large-scale irrigation schemes; (3) a water environment restoration pilot project in Lake Tai; and (4) a model planning of afforestation in Sichuan province. In Xinjiang, JICA is undertaking a development study of sustainable underground water in the Tulufan Basin and a development study of comprehensive landslide disaster control in Yunnan province in the Xiaojiang River, a tributary of upper Yangtze River.[9] Moreover, JICA is working with the Chinese Ministry of Construction, MWR, as well as local and provincial governments to develop an instruction manual for promoting water saving in irrigation.

While most of Japan's water assistance has focused on technology transfer—the "hardware" of water management—in the last several years, JICA projects have included some initiatives aimed at strengthening China's human capital and policies in the water sector—the much-need water management "software." Moreover, JICA has just started to set up a water rights project in China drawing on assistance from scholars affiliated with the Japanese Ministry of Land and Transportation and Japanese universities, and conduct a case study of the Taize River in Liaoning province. As part of a JICA model planning project to promote water saving measures in large-scale irrigation schemes, the Japanese Institute of Irrigation and Drainage has been conducting a technical information exchange program in China with the goal of introducing the Japanese experiences

BOX 4:
U.S. NGOS AND UNIVERSITIES INVOLVED IN WATER WORK IN CHINA

WWF-China. WWF-China has several major integrated river basin management initiatives on the Yangtze River, which include demonstration projects to improve flood control by restoring wetlands and lakes and increasing public participation in water management through community education and NGO capacity building activities. In 2005, WWF established a small grants program that funded 22 projects aimed at promoting the conservation of Yangtze aquatic species.

Conservation International. Since 2005, Conservation International (CI) has been working with The Nature Conservancy and China's State Forestry Administration on developing payment for environmental services (PES) system for carbon and water in southwest China. A pilot project in Lijiang, Yunnan Province (part of CI's Forest for Climate Community and Biodiversity project) is being planned to work on watershed protection and reforestation issues with upstream farmers and downstream water users in the city of Lijiang. CI also is collaborating with the Environment and Natural Resource Protection Committee of China's National People's Congress in research and projects to help inform the creation of PES legislation in China.

Roots & Shoots. Roots & Shoots is a project of the Jane Goodall Institute (JGI) China. In early 2006 JGI China will begin cooperation with the Chengdu Urban Rivers Association (CURA, a Chinese NGO) on a "model eco-village" project in rural Sichuan as part of a watershed clean-up project. In an attempt to cleanup the water sources supplying the city, CURA is working in watersheds upstream to address issues of agricultural run-off from chemical fertilizers and pesticides. CURA, Sichuan University, JGI China, and Roots & Shoots, will be working with one upstream village to take an integrated approach to addressing runoff problems by working simultaneously on environmental education, organic agriculture, and local livelihood issues.

The Nature Conservancy. In partnership with the government of China and related academic institutions, The Nature Conservancy (TNC) is developing a comprehensive, scientific map of the distribution, representation, and viability of China's important biodiversity. Within this initiative the National Development and Reform Commission and SEPA are for the first time working in collaboration on a single plan to inform sustainable economic decision-making, and to redesign and expand China's protected area system. As part of this partnership, TNC will develop extensive databases for assessing and monitoring freshwater biodiversity in the upper Yangtze region and establish conservation priorities and strategies for protecting those resources in this important region that is home to approximately 350 million people. TNC has also catalyzed an assessment of sustainable energy options for an integrated power grid in which hydropower development is designed to the greatest extent possible to conserve freshwater ecosystems and sustain local livelihoods.

BOX 5:
JAPANESE RESEARCH CENTERS AND NGOS INVOLVED IN WATER WORK IN CHINA

Ramsar Center Japan. Ramsar Center Japan (RCJ) has been actively involved in research and public awareness of wetlands in Japan, China, and Asian countries. In China, Ramsar Center Japan (RCJ) has collaborated with the Beijing-based office of Wetlands International-China to conduct environmental education and exchange programs (held in Dafeng, Jiangsu province in 2004 and Zalong nature reserve, Heilongjiang province in 2005) on wetland preservation for primary and junior high school children from China, Korean and Japan.[15]

Japan Environmental Council. In November 2005, some members of the Japan Environmental Council (JEC) visited Henan province to investigate opportunities for cooperation with a unique local NGO the Huai River Protectors (see Part II, Box 2) on water pollution problems in the Huai River. One member of JEC is planning to invite the NGO's founder Huo Daishan to Minamata in September 2006 to hold a photo exhibition for the Japanese public to help boost exchanges with other Asian NGOs that work with pollution victims.

Mekong Watch. Mekong Watch is a Tokyo-based watchdog and policy research NGO for the Mekong River.[16] In 2005, Mekong Watch dispatched one staff to Kunming, Yunnan province to conduct research, jointly with a local NGO Green Watershed (See Part II, Box 2), about potential threats dam building and other development in the upper reaches of the Mekong River pose to the environment and citizens living in the basin in Yunnan province, as well as downriver.

Japan-China New Century Association. Japan-China New Century Association conducted a Japan-China Water Forum in Beijing (April 2004) and in Sapporo (October 2005) with its counterpart China National Youth Union to boost exchanges between governmental officials, scholars, business representatives, and NGO activists in both countries around the issue of water resource protection.

Japan-China Water Forum. Since 2004, the Japan Water Forum[17] has carried out a Japan-China Water Meeting to invite water experts in Japan and China to meet and exchange information to promote mutual understanding on water issues between both countries.

including Land Improvement Districts (LID). LIDs have been used in Japan for over forty years and represent a successful participatory irrigation management practice highly relevant for China.[10]

U.S. Government Water Work in China

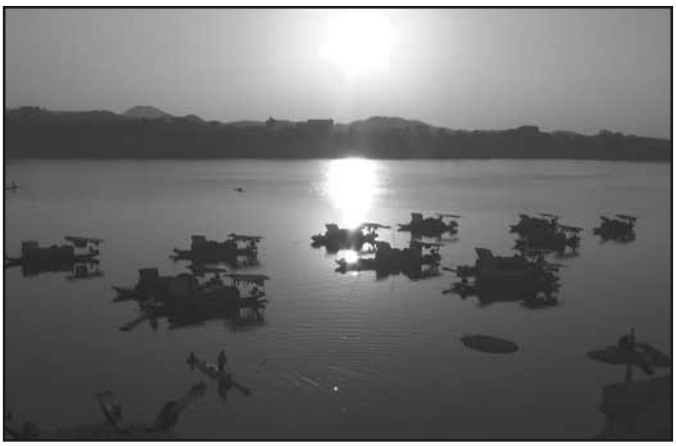
In stark contrast to Japan, U.S. government agencies do not provide loans or grants to the Chinese government for environmental projects. Due to congressional restrictions on direct assistance to China, the nearly 20 U.S. government agencies currently carrying out over 100 environmental or energy initiatives in China support their work by internal agency budgets not formal development assistance.[11] Despite limited funding, under the 1979 U.S.-China Scientific and Technology Cooperative Agreement the two countries have signed thirty protocols which form the foundation for joint projects, research, and information exchange on natural resource protection, atmosphere, marine health, pollution and energy issues. While air quality and energy efficiency related projects are the key areas of cooperation, research, and exchange between the United States and China, over the past few years U.S. agencies have undertaken some comprehensive water projects in China. Some examples of U.S.-government led water initiatives are outlined below.[12]

Department of Agriculture and Environmental Protection Agency. Since 2000, U.S. Department of Agriculture (USDA) and U.S. Environmental Protection Agency (EPA) have been conducting water quality monitoring, wastewater reuse, and watershed management demonstration projects on the lower reaches of the Yellow River. For example, since 2001, EPA and USDA in collaboration with MWR and two provincial environmental protection bureaus (EPBs) have been conducting joint wastewater treatment and monitoring demonstration projects in Shandong and Henan provinces.

USDA's Economic Research Service has been working with the Chinese Academy of Sciences, MWR, Australian Bureau of Agricultural and Resource Economics, and University of California, Davis in conducting research into water resource and agricultural production issues in China. The core of their cooperation since 2003 has been collecting data for a Yellow River Basin Model, which in 2005 produced preliminary scenarios of water trades and environmental flows in the basin. The scenarios indicate that there are substantial gains to be made from water trades that could actually increase grain production. These partners are also conducting surveys in the basin analyzing water-saving technology adoption and the creation of water user associations and canal contracting reforms for irrigation districts.

In 2006, USDA's Economic Research Service is proposing a new initiative with researchers at MWR to better understand the hydrological implications of irrigation management reform and water-saving irrigation technology adoption so they can incorporate the effects of the impacts into the hydrological component of the Yellow River Basin Model. In addition, they would focus research on the de facto property rights to water in rural China in order to propose formal property right systems that closely match current practices.

In 2006, EPA will complete a Clean Water for Sustainable Cities in China Program in the Hai River Basin. This water quality-focused project is being done



Fishing Boats near the headwaters of the Ganjiang, where the water is still relatively clean. (Photo Credit: Xiao Qiping)

in collaboration with the Tianjin Environmental Protection Bureau, SEPA, MWR, Hai River Conservancy Commission, Global Environment Facility (GEF), and ADB. This project aims to increase public access to safe drinking water and sanitation, and to promote watershed management in the Hai River Basin near Tianjin. The project is focusing on protecting the quality of source water at the Yuqiao Reservoir through improved management of waste and runoff from villages, hotels, restaurants, fishponds, and agriculture surrounding the reservoir. The project will advance the development of a watershed management plan in collaboration with the GEF Hai Basin Integrated Water and Environment Management Project. A new water pollution prevention initiative is emerging from a 2003 bilateral agreement signed between SEPA and EPA, which includes a Memorandum of Understanding to undertake pilot projects on water pollution trading in China.

International Environmental NGO and Research Institutes Working on Water in China

Over the past few years, international NGOs have begun to do more work in the area of river basin protection and management. Although some U.S. environmental NGOs are particularly active in Chinese river basin protection as a core or secondary area of work (see Box 4) Japanese environmental NGOs and research centers also have become quite active conducting study tours, joint studies, conferences, and workshops around the theme of river basins in China. (See Box 5). These international NGO and research institute water projects have been building networks that bring together (often for the first time) central, provincial, and local government agencies, research centers, and Chinese NGOs. In short, such projects are creating new lines of communication and increasing stakeholder participation around water protection in China.

Conclusion

The magnitude of the water problems in China and the government's openness to outside assistance has led to this growing involvement of international organizations in water management and pollution control throughout the country. Over the past few

years, international organizations have moved from small project-oriented initiatives (e.g., wastewater treatment installation) to more ambitious basin-wide or national policy focused initiatives (e.g., reforms of RBCs and working on water rights issues). The number and scope of international water projects in China have grown, yet the organizations conducting this work are rarely sharing their project's successes or lessons learned. The variety of international river initiatives introduced above offers insights into potential options for U.S.-Japan collaboration on river basin governance in China, which we discuss in Part IV.

Notes

1. Information in this section is drawn from talk by World Bank senior irrigation specialist Liping Jiang to the China Environment Forum (CEF) and Institute of Developing Economies (IDE) study group in Beijing on 17 June 2004.

2. Information in this section drawn from talk by People's University Professor Ma Zhong and his research team to the CEF/IDE water study group at Tsinghua University in Beijing on 16 June 2004.

3. Hildebrandt, Timothy and Jennifer L. Turner. (2005). "Water Conflict Resolution in China." *China Environment Series*, Issue 7. (pp. 99-103).

4. Information in this section is drawn from talk by European Union representatives Alan Edwards and Wang Yongli to CEF/IDE study group at Tsinghua University in Beijing on 16 June 2004.

5. European Union. (2002). *China: Country Strategy Paper 2002-2006*. [Online]. Available: http://europa.eu.int/comm/external_relations/china/csp/index.htm

6. Information in this section is drawn from talk by CCICED IRBM Task Force representatives Yu Xiubo & Li Lifeng to CEF/IDE study group at Tsinghua University in Beijing on 16 June 2004.

7. IRBM case studies WWF has carried out in the Yangtze Basin include: (1) Xianghexi River Basin; (2) Lake Zhangdu River Basin on wetland and river basin management; (3) Minshan Mountain System to draw lessons from a landscape restoration project; (4) Lake Poyang where WWF has been working with local stakeholders (government, NGOs, and community groups) to devise an IRBM Action Plan; and (5) Danjiangkou Reservoir (upper Han River).

8. The CCICED report in English [Online]. Available: www.harbour.sfu.ca/dlam

9. Information in this section is drawn from presentation by JBIC representative Naoki Mori to CEF/IDE study group at Tsinghua University in Beijing on 16 June 2004.

10. Information in this section is drawn from talk by JICA representative Mr. Satoshi Nakamura to CEF/IDE water study group at Tsinghua University in Beijing on 16 June 2004.

11. Yamada, Nanae. (2005). "Irrigation and River Basin Management in Japan: Toward Sustainable Water Use." In Turner and Otsuka (Eds.), *Promoting Sustainable River Basin Governance: Crafting Japan-U.S. Water Partnerships in China. IDE Spot Survey No. 28* (pp. 83-101). Chiba, Japan: Institute of Developing Economies/IDE-Jetro. [Online]. Available: http://www.ide.go.jp/English/Publish/Spot/28.html. Yamada, Nanae. (2005) "Situation and Tasks of Participatory Irrigation Management in China." *Ajiken World Trend*, Vol.122, 14-17. [In Japanese]. For more information on Japanese Institute of Irrigation and Drainage: http://www.jiid.or.jp/e/index.html

12. Turner, Jennifer. (2002 2003, & 2005). "Inventory of Environmental and Energy Projects in China." *China Environment Series*, Issues 5, 6, and 7. Washington, DC: Woodrow Wilson Center.

13. Ibid.

14. Ibid.

15. See RCJ web site at: http://homepage1.nifty.com/rcj/english/menu-top.english.html

16. See the web site at: http://www.mekongwatch.org/english/index.html

17. See the web site at: http://www.waterforum.jp/eng/

PART FOUR:
OPPORTUNITIES FOR JAPAN-U.S. COLLABORATION ON RIVER BASIN GOVERNANCE IN CHINA

Over the past fifteen years, despite the Chinese government's promulgation of ever-stronger water protection policies and more ambitious targets and campaigns to clean up major rivers and lakes, the quality of China's waters—particularly rivers—has decreased markedly. Domestic reforms of water laws and international assistance have helped push forward the concept of integrated water resources management in China. Nevertheless, the policy changes and international assistance necessary to mitigate China's water problems, particularly to protect river basins, will demand creative thinking and dialogue with environmental experts and practitioners from global, regional, national, and sub-national organizations. Assisting China on a path to sustainable river basin development in the coming decade is of such great importance that Japan and the United States in particular should do their utmost to cooperate—or at least to coordinate their efforts—in this important arena, and to share the benefits of their experience and technology.

The U.S. and Japanese governments (as well as NGOs and research institutes) are quite active in assistance and research on environmental protection issues (particularly water) in China. However, little information is shared and there are no formal joint initiatives between the U.S. and Japan. Economic slowdowns, shifting geopolitical priorities, and recent major natural disasters have led both the United States and Japan to make some cutbacks on overseas development assistance. Therefore, information sharing and joint work in international environmental assistance could enable both countries to increase the impact of their shrinking aid budgets as well as avoid investing in redundant projects in China and other developing countries.

Below we first discuss how the Japanese and U.S. governments have come to prioritize water in their international assistance programs. We then highlight some possible areas of collaboration between governments, NGOs, and research centers in the United States and Japan on protecting rivers in China along the three themes crucial for integrated river basin management (IRBM): (1) river basin management institutions, (2) financing mechanisms, and (3) public participation.

Water Priorities in International Assistance

Both the United States and Japan are giving water sector issues a high priority in their international assistance programs, often as part of broader poverty relief or urban development efforts in developing countries. In 2003 one major recommendation emerging from the Third World Water Forum held in Japan was the need for greater international cooperation on water issues in developing countries. In the spirit of this recommendation, the

Japan Water Agency and the Asian Development Bank initiated the Network of Asian River Basin Organizations (NARBO) project at the World Water Forum. Drawing on Japanese experience in water development and conservation, NARBO aims to promote integrated water resource management (IWRM) in river basins across Asia through advocacy, training, technical advice, and regional cooperation.

Within the U.S. Agency for International Development (USAID) the protection and environmentally sound development of the world's water resources is a top priority. In countries around the world, USAID projects and investments in the water sector have focused on improving access to safe and adequate water supply and sanitation, improving irrigation technology, protecting aquatic ecosystems, and strengthening institutional capacity for water resources management. Between 2003 and 2005, USAID invested over $1.7 billion to improve sustainable management of freshwater and coastal resources in more than 76 developing countries. During this same period more than 24 million people received improved access to freshwater, nearly 28 million people received improved access to sanitation, and some 3,400 watershed governance groups were convened to undertake basin-scale, integrated water resource management decision-making.[1] USAID may expand its water work in light of the Senator Paul Simon Water for the Poor Act of 2005 that was signed into law on 30 November 2005. This new act aims to make safe and affordable drinking water and sanitation, and sustainable water resources management a cornerstone of U.S. foreign policy.

In addition to independent assistance around the world, the United States and Japan are exploring ways to strengthen their water programs through cooperative efforts. At the World Summit on Sustainable Development in 2002, the U.S. and Japanese governments launched a new cooperative initiative on water (the U.S.-Japan Water Partnership), in which the two countries agreed to pursue joint or parallel water projects in developing countries. USAID and the Japan Bank for International Cooperation (JBIC) are now leading efforts to implement water financing projects and programs in four countries—the Philippines, Indonesia, Jamaica, and India. In the Philippines, for example, two pilot projects are well underway. In one project the Municipal Water Loan Financing Facility will tap a JBIC-supported credit facility and private investment that is backed by USAID's Development Credit Authority. Meanwhile, a feasibility study was completed in early 2005 for a new Philippine Water Revolving Fund, scheduled for launch in early 2007. Similar financing and related programs are under design in the other three pilot countries. While China is not currently targeted under this collaborative program, it is clearly a country that could benefit from such joint U.S.-Japan assistance on water financing.

Possible Areas of Collaboration

China's water needs are vast and complicated, however using the IRBM lens with a focus on management institutions, financing, and public participation we present a kind of "buffet" of ideas that are meant to help catalyze some thinking in the United States and Japan (as well as other countries) on potential areas of water collaboration in China. The potential for joint assistance lies not only between the Japanese and U.S. governments, but also between nongovernmental and research sectors in both countries.

Legislative and Institutional Reforms

To promote legal and institutional reforms to push the IRBM concept in China, joint work by the U.S. and Japanese governments could focus on setting up a small pilot program in one watershed (e.g., tributary, lake, or estuary) within one of the seven major large river basins, all of which have river basin commissions (RBCs). Pilot programs could focus on one small-scale institutional change—such as water rights, water user associations, or pricing. An even more ambitious pilot project, which was recommended by the CCICED (China Council for International Cooperation on Environment and Development) IRBM Task Force, would be the creation of tributary-, lake-, or estuary-level management commissions comprised of provincial governments, local administrations, and stakeholder representatives.[2] These local-level watershed management commissions would be responsible for the watershed's plans and targets, as well as overseeing trials of stakeholder participation and economic incentives to encourage protection of the watershed.

This on-the-ground pilot work to reform RBCs from the bottom-up could be strengthened by an exchange in which members of the large RBC that oversees the project area could work in a U.S. and Japanese river basin commission for several months. Visiting some RBC with mechanisms for involving all basin stakeholders could not only offer Chinese river managers insights into how to be more inclusive in their work, but also how to prevent or resolve water conflicts. China's problems in dealing with domestic and international water conflicts have increased in great part because government bureaucracies focus almost exclusively on managing rivers for economic development rather than following a development path to balance both human and ecological needs. In contrast, Japan, U.S. and other developed countries now put increasingly greater emphasis on ecological value of river flow. River basins are not without strife in the United States and Japan, but both countries have worked to create laws and institutions that emphasize the value of river flow and provide formal channels for participation and dispute resolution.[3]

Although many river basins in Japan and the United States are considerably smaller than the seven main basins in China, we believe they still offer lessons that could be applied at the sub-basin level in China. It merits mention since China's RBCs have been in existence since the 1950s, the reforms they are undertaking also could provide important insights for the United States and Japan, both domestically and in international assistance. The Delaware River Basin Commission (DRBC) is one U.S. RBC that merits study. Since being created in 1961, DRBC and its members (the four riparian states and federal government) have not only resolved contentious conflicts among the states, but also acted as a forum to effectively mobilize government, citizen and NGO communities to solve water shortage and pollution problems. In contrast to China's RBCs that do not have provinces as members and lack sufficient power and inclusiveness, DRBC offers an interesting model for how a commission can achieve better governance of a river basin if given sufficient regulatory authority and ability to bring together multiple stakeholders.[4]

Japanese river basin committees also offer valuable examples for Chinese counterparts, for both countries have very centralized systems of managing rivers. In 1997, Japan's River Law was amended to require the creation of river basin committees, which have since been established on many lakes and rivers. Although these committees are a relatively new

In southern China the ecosystems of many rivers and lakes are seriously impacted by eutrophication caused by pollution and agricultural runoff. This destruction of the water ecosystems often has enabled invasive species to run rampant. The above photo shows a lake in Fujian Province overrun by an invasive plant. (Photo Credit Deng Jia).

institution in Japan, they already have gained considerable experience in gathering stakeholders together and building consensus on sensitive development and environment issues in river basins. For example, the Yodo River Basin Committee is a unique consulting organization in that during four and a half years it held over 400 basin management planning meetings that were open to the public.[5] Although this committee was set up by an initiative of the regional development bureau under the Ministry of Land and Transportation, it is run not by the bureau, but by consultation with members, who are scholars, and community and NPO representatives. A private company carries out the committee's administrative work. Opening up the discussions to the public have made them slow, for the committee is still working on draft management plan for the basin. However, once implemented the plan should face little opposition and conflicts will be easier to resolve.

We concur with another recommendation in the CCICED IRBM Task Force report, which suggests in addition to these on-the-ground trials more international assistance could focus on some national-level institutional and legal changes in water governance institutions in China.[6] For example, in partnership with the central government, international partners could help in reviewing and revising river basin management and water pollution control legislation to reduce contradictions and clarify institutional responsibilities of RBCs. One mechanism of cooperation for revising the laws could be inter-parliamentary exchanges. For example, some members of the National People's Congress Committee on Environmental Protection and Natural Resources could meet with their Japanese and U.S. counterparts to learn about some of the more effective laws both countries have made in relation to river and water protection (e.g., the Wild and Scenic Rivers Act in the United States).

Another possible high-level initiative promoted by the IRBM Task Force to mitigate the many-headed dragon dilemma is the creation of a national-level IRBM commission that would include the National Development and Reform Commission, Ministry of Water Resources and the State Environmental Protection Administration (SEPA).[7] This commission could oversee changes in laws and create new laws to promote adoption of IRBM nationally.

Similar to many other countries, in China a crisis—such as toxic water pollution incidents in the Songhua River and major flow cut offs in the Yellow River—can act as a driving force for unifying government agencies to protect rivers. However, cooperation in response to river crises in China often has created more government centralization of authority over rivers or ineffectual campaigns—not ideal ingredients for creating an integrated institution for sustainable water governance. Creating an incentive mechanism to promote governmental collaboration would be crucial to establish strong IRBM in China. To promote such collaboration two important areas of study would be to: (1) identify specifically how and when collaboration between functional specialization organizations (e.g., water suppliers, wastewater treatment facilities, and flood control agencies) will be socially beneficial, and (2) examine how best to mobilize sufficient political will to force functional specialization organizations to collaborate when they should.[8] Information and data sharing would be the most realistic first step for China to take not only to improve planning and implementation of water protection policies, but also to save cost and time in resolving water problems, which ultimately could benefit all stakeholders.

Utilizing New Financial Mechanisms and Incentives

"Who gains the benefit and who pays the cost" are major questions when discussing the economics of sustainable river basin governance. To answer these questions Chinese policymakers appear enthusiastic about introducing market-based instruments as a new enforcement tool for environmental regulations or promoting conservation—particularly of water. Water right trading is attracting much attention among Chinese technocrats and scholars as a method of improving conservation of water. However, China's unclear water rights system and weak legal institutions hinder any current systematic application of water markets.[9]

Water rights represent a very complex and sensitive issue in China. However, both the U.S. Department of Agriculture (USDA) and the Japanese International Cooperation Agency (JICA) are independently undertaking projects focused on clarifying water rights in China. Even if a formal partnership is not feasible, the insights both the USDA and JICA gain from pilot projects and research in this area should be shared and disseminated more widely. Such information sharing could help identify some opportunities for joint work in this area.

Water pricing needs to increase in China in order to cover the costs of building and operating water supply systems and wastewater treatment plants. Currently there does not appear to be a good model of cost sharing for water conservation in China, which represents an urgent and challenging task for China's sustainable river basin governance. The government and NGO sectors in Japan and the United States could work with the

Chinese government to create funding mechanisms to promote conservation of river and wetland resources. Although the interest within the Chinese government is great, there are few Chinese or international initiatives focused on financing to promote conservation of water resources (e.g., payment for environmental services schemes, green taxes, revolving funds, and municipal bonds) or using market mechanisms (e.g., water trades and water banks). In light of these challenges in water financing, possible areas of U.S.-Japan-China collaboration are presented below.

Establishing payment for environmental services (PES) pilots. How to set up mechanisms to motivate downstream water users to compensate those upstream to protect watersheds is a challenge faced in many countries. The United States can provide examples on how this has been done successfully and one model can be found in USAID programs that have supported numerous PES pilot projects in rivers in developing countries. Another model can be found in new taxation schemes aimed at promoting protection of upstream water resources and forests that were adopted by many Japanese prefectural governments. This "green" taxation scheme only has been in use for two years in Japan, so it is too early to evaluate its effectiveness on protecting the rivers. However, Chinese policymakers and river managers could study these schemes to learn how to introduce economic incentive methods to protect water resources based on partnerships among upstream and downstream stakeholders. There is some precedent for such schemes in China in that the Chinese government has developed some compensation policies (mainly fees, subsidies, taxes, and punitive measures) to protect forestry resources. For example, timber cutting is banned in much of southwest China and reforestation is being encouraged by compensating farmers with extra grain and subsidies for converting agricultural land on slopes into forests. These forest protection programs, however, are government, rather than market-led programs.

Expanding water user associations for both water quantity and quality protection. While the World Bank has helped establish nearly 2,000 water user associations in China, many local water bureaus in rural China have faced severe difficulties in providing adequate service and in assessing sufficient water charges. Thus there is clearly need for an examination of other successful models of water user organizations overseas, particularly those that promote pollution control. For example, in the Netherlands, water board organizations that are constituted of local stakeholders have played a crucial role of setting water pollution charge rates to share the costs among members.[10]

Creating revolving funds to support water conservation and pollution control initiatives. In 1987 when the U.S. Congress amended the Clean Water Act, an innovative Clean Water State Revolving Fund (CWSRF) program was created. The CWSRF program is available to fund a wide variety of water quality projects including non-point source pollution, watershed protection or restoration, and estuary management projects, as well as more traditional municipal wastewater treatment projects.[11] Such a fund has been the target of some pilot projects in China. For example, in 2004, as part of their wetlands restoration project in the mid-reaches of the Yangtze River, WWF-China set

up a revolving fund that aims to help farmers in Qiuhu village who lost land to the restoration of wetlands develop alternative livelihoods. The seed funding has helped these farmers create bamboo nurseries, sustainable fishing, ecotourism ventures, and hydroponic vegetables. In the first round of funding 104 households have paid off their loans with interest into a pool that will enable other farmers to take out loans.[12]

Utilizing municipal bonds to fund wastewater treatment plants. In terms of water pollution control, the central government does not have any formal policy to cover part of the costs for wastewater treatment plants and local governments often are unwilling to make the investment into wastewater treatment for it is viewed as a hindrance to local economic development. One possible solution that would demand considerable changes in the legal and financing institutions in China would be the creation of municipal bonds to fund environmental infrastructure such as wastewater treatment plants. The World Bank and the U.S. Trade Development Agency completed a successful pilot project in Shanghai on issuing a municipal bond for wastewater treatment. Other similar pilots could be done in other cities in collaboration with municipal governments and the National Development and Reform Commission in order to help identify the kinds of adjustments needed in existing tax and finance laws to encourage investors to enter the municipal bond market and to create mechanisms and laws to minimize risks of municipal bonds.[13]

Experimenting at small-scale water trades. While some, albeit illegal, water trades have taken place in China, as mentioned in Part II, the U.S. and Japan could build on their current work on water rights to help set up some institutions at the local level for water trading.

Incorporating broader costs and benefits into EIAs and planning. International initiatives focusing on various financing initiatives could follow the CCICED IRBM Task Force recommendation by undertaking pilot projects in a single river basin.[14] Ideally, RBC development and planning decisions should be based on environmental impact assessments (EIAs) that include criteria that value not just economic costs, but also social and environmental costs and benefits. Joint U.S.-Japanese-Chinese teams could undertake studies and pilot projects to identify obstacles and potential solutions for incorporating true environmental, ecological and social impact assessments into river management.

Opening up the Floor to Greater Stakeholder Participation

Since the mid-1990s the Chinese government has actively encouraged more public participation in the environmental sphere—not just due to international projects that promote collaboration between government and citizens, but also because of political changes during the reform period granting more openness in society. Some reforms that have spurred more citizen involvement in environmental protection and markedly changed the relationship between citizens and the state include: a more open news media, registration rules that permit

individuals to establish NGOs, the right to sue in cases of personal injury, public comment requirements on EIAs, and a gradual increase in access to information. Such trends are promising and open up opportunities for international involvement in increasing public participation in river basin management. Parts II and III included some examples of domestic and international NGO and bilateral aid work in promoting public participation, but SEPA and other Chinese agencies acknowledge more such work is needed in this area. The basic requirement for public participation in river management is the ability of river basin stakeholders to access all information and have a voice in shaping IRBM planning, EIAs, and management decisions made in the basin. There are a number of opportunities for U.S. and Japanese governments, NGOs, and research centers to help push forward greater stakeholder participation in both water management and pollution control spheres.

(1) Basin-level forum. The CCICED IRBM Task Force recommended the creation of a Development and Conservation Forum in each large river basin to act as a platform for communication and consensus building between different provinces and between government, NGO, and research stakeholders.

(2) Sub-basin or municipal-based forums to promote corporate social responsibility (CSR). While industries are often the main polluters, it is difficult to motivate them or local governments to work with communities, NGOs or universities on adopting pollution prevention measures. However, some international organizations could create initiatives to educate businesses and other stakeholders in a sub-basin or city on how CSR work protecting water resources ultimately is profitable for businesses. Examples of CSR for water pollution control include: voluntarily exceeding government emission standards; disclosing emissions information to the public; mandating green supply chains; building NGO-business partnerships; participating voluntarily in water pollution trading pilot projects; and adopting transparent emergency management system mechanisms.[15]

(3) Basin-to-basin exchanges. Basin management officials and NGOs could participate in exchanges to visit Japan and the United States to learn about how the public is brought into the management of rivers and watersheds.

(4) Public hearings for basin management decisions. In areas with IRBM pilot projects one crucial mechanism will be the creation of regular participation for community members in the planning and implementation of watershed management measures. Many hearings today in China are simply meetings for the public to make comments after most discussion has taken place. In November 2005, SEPA requested international advice on designing regulations to advance public participation in EIAs. Soon SEPA will need assistance in conducting trainings once they set these new regulations.

(5) Legal assistance for pollution victims. Helping citizens access the courts in cases of water pollution accidents could play a major role in putting pressure on local governments and industries to enforce existing water pollution protection laws. Currently only one Chinese NGO is doing work to help victims of pollution, which means this legal avenue is very underserved in China.

(6) Training of Chinese NGOs. Chinese environmental NGOs have built their capacity and increased their effectiveness in great part due to support from international

NGOs, foundations, and other governments.[16] This external assistance has been invaluable, yet more could be done specifically on water. For example, there are a number of bilateral and multilateral river basin initiatives but few have brought NGOs into the process. Involving NGOs in such projects would be crucial for establishing them as legitimate participants in river basin management.

(7) Cultivating stewardship. While promoting partnerships between the government and public on jointly managing rivers is crucial, a more significant change would be to empower citizens to become stewards of the water and surrounding land. The more citizens are involved in caring for river basin resources the less costly it will be for the government to protect rivers. There are examples of the Ramsar Center Japan (RCJ) working in estuaries in Japan and India, in which RCJ not only facilitated successful citizen partnerships with government agencies, but also empowered citizens to become the leading decision-makers on how to restore the coastal lagoon ecosystem and simultaneously improve their livelihoods.[17] A stewardship approach to water resource management is a wise complement to the regulatory approach, and represents the best hope for achieving the long-term vision and sustained action needed to maintain essential ecosystem goods and services at the basin-scale over time.[18]

Conclusion

As a strong emerging economy and the "world's factory," China's impact on the global market—both in product exports and commodity imports—is great and will grow over the coming decades. The choices the Chinese government makes today in terms of environmental protection and energy conservation also will have global impacts well into the future. China has shown considerable progressiveness in its environmental and energy conservation lawmaking that could turn the country into a model for sustainable development. However, implementation and enforcement of these laws have been very uneven, particularly in the water sphere.

While the challenges facing China in the water sector are formidable, the openness of the Chinese government for internal reforms on water management and interest in outside models to mitigate water problems highlights an important opportunity for Japan, the United States, and other countries to assist China. The United States and Japan could offer China different backgrounds and experiences in river basin management, which could inspire many options and ideas for protecting Chinese rivers. Such collaboration also could help encourage new U.S.-Japan water partnerships in other countries. In short, we believe Japanese-U.S. collaboration in reaching across the Pacific to promote sustainable river basin governance could not only contribute to water security in China, but also around the world.

Notes

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