Impact Stories from the People’s Republic of China

Partnership for Prosperity

Asian Development Bank
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Note: In this publication, “$” refers to US dollars.
The People’s Republic of China (PRC) has achieved remarkable economic growth and development after initiating, some three decades ago, reforms that have dramatically reduced poverty. The Asian Development Bank (ADB) has contributed to these accomplishments since starting its operations in the PRC 25 years ago, in 1986, by providing expertise and funding for development projects.

To commemorate the 25th anniversary of ADB’s operations in the PRC, we have produced this retrospective collection of impact stories that highlight some of the successful development projects supported by ADB during this period and describe the people and places benefiting from them. The stories, which are presented in their originally published form and thus are based on the data and information available at the time they were written, illustrate the range and diversity of the projects supported by ADB and underscore many important dimensions of our 25 years of partnership with the PRC.

ADB’s operations have evolved in response to the PRC’s changing development needs, and the PRC–ADB partnership has broadened and deepened as the country has undergone its remarkable transformation. We have carefully targeted our support on areas where we have core competence—in recent years on clean energy, urban infrastructure, and sustainable transport, among others—resulting in the greenest and most innovative program among ADB’s developing member countries. We have also over time focused our operations on the less affluent central and western regions.

The PRC now stands as one of ADB’s largest clients, and as of the end of 2010, ADB had financed 171 public sector projects (more than $23 billion in lending) and 26 private sector loans, guarantees, and equity investments (totaling $2.5 billion). In addition to financing, ADB’s support to the soft sectors—knowledge, advisory support, capacity building—has significantly increased in recent years in view of the PRC’s rapid development and strong capacity to internalize and replicate best practices and policy advice.

In the early years, ADB focused on providing financial resources to fund public investment in the infrastructure necessary to facilitate rapid economic growth and poverty reduction, particularly in the transport sector. The ADB-assisted Nanpu and Yangpu bridges, which provided the transport infrastructure essential for the phenomenal growth of Shanghai’s Pudong New Area and the Chuxiong–Dali expressway in the western province of Yunnan that brought widespread benefits to the rural poor, are good examples of such projects.

Innovation and value addition have long been important dimensions of the PRC–ADB partnership, and ADB has supported many critical
development projects that were first piloted and then replicated and scaled up at the provincial and national levels. A pioneering build–operate–transfer project that brought foreign investment and increased the supply of clean drinking water in Chengdu, the capital of Sichuan Province; and a project that captures and produces coal mine methane for power generation while reducing carbon dioxide emissions in Shanxi Province are illustrative of the types of innovations ADB has supported across a range of sectors.

The promotion of environmental sustainability has emerged as a strategic pillar of ADB’s operations in the PRC given the large demand on resources resulting from the country’s rapid growth. In this volume are stories showing how ADB has supported efforts to clean up Shanghai’s Suzhou Creek, protect the Sanjiang Plain comprising the PRC’s largest area of wetlands from human encroachment, and increase coverage of wastewater treatment and improve water resources management in the upper Songhua River Basin, among other examples of ADB’s support for environmental protection and improvement.

ADB has also played a leading role in supporting regional cooperation between the PRC and its neighboring countries, including through investments in infrastructure connectivity to help develop key economic corridors and technical support to promote regional public goods.

The stories on ADB’s support for an all-weather road connecting a remote area of the PRC’s Yunnan Province with Lao People’s Democratic Republic and hence the broader Greater Mekong Subregion, and grassroots approaches to check the spread of HIV/AIDS along the PRC’s southwestern border regions in Yunnan Province are examples of ADB’s support for regional cooperation.

ADB will continue to support the PRC on its development agenda. Our next 5-year country partnership strategy coincides with the PRC’s 12th Five-Year Plan covering 2011–2015 and will be aligned with its priorities. Looking beyond, with the continued development of the PRC economy, our value addition will shift further to the soft side—knowledge, advisory support, and capacity building rather than large-scale financing—though we expect to continue financing smaller pilot-type projects to test concepts and new approaches.

I hope that you find the stories in this brochure interesting.

Klaus Gerhaeusser
Director General
East Asia Department
Asian Development Bank
Bridges Bring Boom

The phenomenal 20% growth rate of Shanghai’s Pudong area is linked to new infrastructure—and plans exist to build a lot more

By Ian Gill

FROM THE ARCHIVES: This story was first published in May 2002.
A decade ago, the Asian Development Bank (ADB) helped build Shanghai’s first bridges across the Huangpu River to spark the development of Pudong. But Pudong’s growth soared beyond expectations and, although several transport links have been added, strong demand exists for more. A Pudong Development Authority (PDA) official estimates that eventually a total of 20 links will be needed for “balanced growth” between Pudong and downtown Shanghai.

When the showcase Nanpu and Yangpu bridges, financed by ADB loans totaling $155 million, were completed, they were a source of pride for Shanghai and the whole country. When then Prime Minister Li Peng inaugurated the bridge in 1991 (and Deng Xiaoping wrote the calligraphy), Nanpu was by far the People’s Republic of China’s (PRC) longest cable-stayed bridge, with a center span of 423 meters. Yangpu, opened in 1993, had an even longer center span of 602 meters, setting a world record at the time. The world-class bridges were designed by Shanghai engineers and built by local contractors.

Before the bridges, vehicles used either a slow ferry or one of two congested tunnels to reach Pudong, a sprawling undeveloped area nearly the size of Singapore.
With the opening of Nanpu bridge, traffic grew phenomenally. Some 12,000 vehicles per day crossed the toll bridge the first month, rising to 17,000 the following month.

### Traffic Volume Larger than Expected

With the opening of Nanpu bridge, traffic grew phenomenally. Some 12,000 vehicles per day crossed the toll bridge the first month, rising to 17,000 the following month.

Today, Nanpu’s traffic averages a 120,000 vehicle a day, close to capacity. Yangpu, its sister bridge, handles 100,000 vehicle crossings a day, including most of the trucks. A third bridge, the Xupu, opened in 1996, carries 70,000 vehicles daily. Three tunnels (two are one-way) under the Huangpu River see 120,000 vehicles pass through every day. In addition to the vehicular flow, tens of thousands of commuters use a subway link that opened in 2000.

The Nanpu and Yangpu bridges, painted white and red respectively to mark the new millennium, have been “very successful projects,” says Chen Jianhua, manager of the Shanghai Huangpu River Tunnels and Bridges Development Company.

“We had estimated a daily flow of 50,000 vehicles for Nanpu, for example, but today we are getting more than double that.”

The larger-than-expected volumes caused such long queues at the tollgates of the bridges and tunnels that the toll system was scrapped in 2000 and replaced with an annual tax on all city drivers. High usage of the bridges requires maintenance costing between CNY4 million ($495,000) and CNY5 million ($620,000) a year per bridge, notes Chen.

### Homegrown Talent

The bridges also represented a significant technological triumph for Shanghai. Their cables were made of high-strength materials and computers were used to calculate the complex stresses involved. Nanpu was designed by the Shanghai Municipal Engineering Design Institute, using the Alexander Fraser bridge in Vancouver as a model. ADB provided technical assistance by bringing an international group of world-class engineers to review it. The Chinese learned quickly and they built Yangpu on their own.

An eminent German bridge engineer noted at the time, “For a developing country to design and construct a world-record, cable-stayed bridge is like winning half a dozen gold medals in the Olympics.” Today, Shanghai designs all its bridges and tunnels, benefiting from home-grown talent produced by Tongji University, famous for its architecture and engineering school.

Pudong has more than borne out the prediction that it would be the “dragon’s head that would pull the body of the Yangtze River Delta,” as one PDA official said in 1992.

### Planning for Future Growth

Shanghai’s annual gross domestic product (GDP) growth has been about 10%, but Pudong’s GDP growth has averaged around a staggering 20% per annum, says Hua Xinxiang, PDA’s deputy director of the Press and Information Office. Pudong’s GDP has increased 18 times from CNY6 billion ($740 million) in 1990 to CNY108 billion ($13.3 billion) in 2001, far exceeding earlier forecasts. In a few hectic years, Pudong has transformed itself from a largely agricultural area into a major financial center, as well as a manufacturing and trading hub.
“We have 59 foreign companies here that are engaged in banking/finance, securities, or insurance,” says Hua. He adds, however, that Shanghai still has to catch up with Hong Kong, China, which has more than 400 such institutions.

On the manufacturing side, Pudong has targeted “clean” industries, such as pharmaceutical, biotech, and information technology and communications companies.

Pudong is aggressively pursuing foreign investors but, at the same time, it has been sheltered from the global slowdown by the PRC’s booming domestic market, notes Hua.

A Good Place to Live
With the PRC’s entry into the World Trade Organization, Hua believes that Pudong will maintain its rapid growth for some years to come. GDP is forecast to reach CNY200 billion ($25 billion) by 2005, especially if transport and other infrastructure development continue.

Over 400,000 vehicles are crossing the bridges and tunnels daily—and that excludes people using the subway. To cope with still-rising demand, Hua says that another bridge, three more tunnels, and two new rail links are planned within the next 5 years.

As well as being a fast-expanding workplace, Pudong is becoming more attractive as a place of residence. Its daytime population is 2.4 million, consisting of 1.6 million residents and 800,000 commuters. But as housing, shopping, and recreational facilities develop, more people are turning from commuters to residents.

Hua and an increasing number of PDA staff reflect this trend. He began using Nanpu after it opened, greatly reducing his traveling time. In 1997, he moved his family to Pudong, induced by attractive housing and living conditions. He says many PDA staffers have done the same.

Mrs. Hua provides a test of Pudong’s quality of life. “In the beginning, she did not like Pudong because it was not convenient for shopping,” Mr. Hua says. “But now she says you don’t need to go to Shanghai to shop and it’s much less congested here.”

**Project Information**

Shanghai Yangpu Bridge Project (1992)

**Financing:**
- $85 million, ordinary capital resources (ADB)
- $79 million, commercial cofinancing
- $102.95 million, borrower financed
Road to Prosperity

A four-lane highway makes traveling faster, cheaper, and safer—and brings new economic opportunities

By Ian Gill
A rest stop by the tollgate of the Chuxiong to Dali expressway, truck driver Yang Peiyong puffs on a cigarette as he recalls the bad times on this road. Mr. Yang, a stocky, cheerful man, has been transporting sugar, tea, timber, and nuts along this road for 20 years, seven or eight times a month. When the road was narrow and congested, he says, the 179-kilometer journey could take more than 4 hours.

“If there was an accident, traffic would be backed up for several kilometers,” he remembers.

Today, he says, a four-lane expressway has made the trip faster, cheaper, and safer. The $627 million project, completed in 1998, was partly financed with a $150 million loan from the Asian Development Bank (ADB).

Sitting in a patrol car by the tollgate, Wu Guangfa, who has been a traffic officer on the highway since it opened, confirms that the safety barrier dividing the highway has greatly reduced the number of accidents, especially head-on collisions. He notes, however, that some drivers doze off and bump into the barriers. Otherwise, Wu says, his main headache is dealing with the theft of traffic signs.

Farther up the highway, trader Lu Jian, who deals in a rare kind of wild mushroom, reports that business has boomed since the travel time to Kunming airport has been cut by some two-thirds to 3 hours. He buys the mushrooms, a specialty of Yunnan Province, from small farmers and exports them to Japan and the Republic of Korea.

“But they must be fresh,” notes Lu. “The highway means I can get them on the plane within a day and this has helped to boost sales.”

School Provides Hope for Minorities

The project also involved upgrading nearly 700 kilometers of feeder roads and this has helped link remote communities to urban centers. For example, in the village of Tianshengtang, off the highway, is the Primary School of Hope, where 85% of the children belong to the Yi group, one
of Yunnan’s many minorities. The expressway company’s general manager, Hu Dejun, proudly points to an inscription by the gate that notes a company donation helped rebuild the school.

School director Duan Xingwan says the number of pupils has risen from 150 to 257, partly because of the better facilities and partly because the better roads provide easier access to the students who come by bus. Zi Xiuhua, one of only three Yi teachers, says many of the Yi children, who come from mountain villages, don’t speak Chinese when they arrive. Instruction is bilingual for the first two grades and thereafter in Chinese. Zi says that, thanks to the school, some Yi children are going on to university and finding good jobs, the key to escaping poverty.

**Flower Industry Blooming**

Such snapshots of life along the highway contribute to the overall picture of how improved transport links in this mountainous and relatively undeveloped western province have brought new prosperity to both the poor and the business community.

An ADB project completion report notes that two municipalities and four counties traversed by the expressway have experienced economic growth rates higher than the national average. Huang Hongzhi, deputy governor of Nanhua county, says, “Our economy was doing poorly before 1998, but the expressway has speeded up development with improved transport and communication. Private business has risen 25% since the expressway opened and more enterprises are coming.”

The flower business is one that is prospering from Yunnan’s mild climate and the growing trend of giving flowers to mark all kinds of occasions.

One nursery situated by the highway near Dazhuang Village, between the provincial capital of Kunming and Chuxiong, has hired more staff

Increased tourism has benefited the province as a whole, but especially the ancient city of Dali at the end of the expressway.
• The resort town of Dali is bordered by mountains and a large lake. The number of visitors to the town has grown steadily since the expressway was completed.

to meet rising sales. “We get a lot of walk-in business from people driving by who are attracted by the bright colors of our flowers,” says nursery administrator Jiang Ming.

Mr. Jiang says his firm operates five other nurseries in the province, and there is stiff competition. All this is good news for women like Hu Mei, who has been a nursery worker for 7 years and contributes CNY500 ($62) a month to the family income.

**New Jobs from Tourism**
Increased tourism has benefited the province as a whole, but especially the ancient city of Dali at the end of the expressway.

Dali is also a resort town, bordered by snow-capped mountains and a large lake, and is known for its old city and pagodas dating from the Tang and Song dynasties.

Zhao Biao, vice-director of Dali Tourism Bureau, says the number of visitors to Dali City has grown steadily since the completion of the expressway and a railway (also in 1998), rising from 3 million in 1997 to 4.56 million in 2001. Most of the tourists come by road from other parts of the country. As a result, tourism’s share of Dali City’s GDP has jumped from 10% in 1998 to over 30% today. The increase has created many new jobs.

Orchid grower Sun Zhiyong, who exports orchids to Japan; the Republic of Korea; and Taipei, China, says his Dali business has tripled, largely because of tour groups, both of orchid lovers and general tourists.

Marble “painter” Wang Min, who cuts and frames pieces of Dali’s famous natural marble, says his business has also gained from an increase in walk-in visitors.

Clearly, the expressway has not only reduced traffic congestion, accidents, and vehicle operating costs, but has brought wide economic benefits to the whole region.

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**Project Information**

Yunnan Expressway Project (1994)

**Financing:** $146.90 million, ordinary capital resources (ADB); $480.30 million, borrower financed.
On the Right Track

A new railway and supporting roads have become a lifeline for one of the PRC’s poorest regions

By Ian Gill

FROM THE ARCHIVES: This story was first published in May 2002.

The 118-kilometer rail track was built over and through some of the PRC’s most rugged terrain.
In one of the loneliest spots in the People’s Republic of China (PRC) stands a monument of modern engineering. The massive Beipanjiang railway bridge—its single span of 236 meters is the longest for a railway bridge anywhere—betrices two mountains over a steep ravine.

The red, arched bridge is an apt metaphor for the Asian Development Bank (ADB)-financed Guizhou Shuibai railway project. Like the trains it will carry, the bridge links a previously inaccessible region in western Guizhou to the outside world. The $381 million project, of which 40% is financed by ADB, has constructed a new 118-kilometer single rail track between Liupanshui and Baiguo over some of PRC’s most rugged terrain. Bridges and tunnels—the longest is 7 kilometers—cover over 65% of the line. Trials have already begun and commercial operations will begin next year.

The project, which has also provided some 200 km of supporting roads, is a lifeline for many of the 620,000 villagers scattered over the area.

No Longer Isolated
Its topography and inadequate transport explain why western Guizhou is one of the PRC’s poorest regions. The rural per capita income is 10% of the national average, and high rates of infant mortality and adult illiteracy persist. Most of the population—nearly 40% are from minority groups—eke out a living from the thin, infertile soil. Until recently, they had no access to electricity, television, or basic health and education services.

Standing on Beipanjiang bridge, over halfway between Liupanshui and Baiguo, Lin Wenhua, chief engineer of the construction company, recalls how, when he surveyed the area in 1999, he crossed the ravine by wading through the waist-high river below. “The water was cold, and it took me 3–4 hours to go from one mountain to another,” he says.

These days, housewife Zhan Linmei, who transports her goods in the time-honored way—on foot—crosses the bridge to buy a sack of oranges from a farmer on the other side. Before the bridge was built, she had to wait for the weekly market in her village of Luoduo. Besides the convenience, she has paid the farmer only 50 fen (US6 cents) per 500 grams for the fruit, half the market price.

Better Diets, More Consumer Goods
To inhabitants of the nearby village of Maojiaodao, for whom a trip to the nearest town used to mean a difficult trek of several hours over mountainous terrain, the project has brought improvements in their diet, as well as easier access to a wide range of products.
Tao Shuxiu, sitting outside her modest home, says, “Before the railway, we never tasted fish and we had limited meat. Even the pigs and chickens lacked nutrients because we couldn’t give them proper feed. Our children lacked vitamins.”

Her neighbor, Zuo Er, a 74-year-old great grandmother, recalls the difficulties of isolation. “When the rice crop failed, we had to survive on potatoes—and we even cooked leaves from the trees,” she says.

New father Tao Dayong, 28, cradles his son as he says that baby food, milk powder, and clothes are within easier reach, and he can now dream of sending his boy to a good school.

For others, like 30-year-old farmer Ou Dajun, who lives further down the track near the station at Fa’er, the railway means he can sell more ginger, look around for income-earning opportunities, and enjoy himself in town.

Before the train, Ou would walk for 1–1½ hours to catch a bus for a 2-hour ride to Liupanshui if he wanted cigarettes or clothes. With the train, he will go more often to look for work or hang out with friends. “It’s hard to improve things on the farm,” he says. “We don’t have the money to buy inputs or technology to increase our yields.”

For his wife Zhao Yinghui, the train could be a savior in a medical crisis. She remembers when their baby broke out in spots and they had to carry him over the mountains for more than an hour to reach the nearest clinic.

Growing Transshipment Center

More than 1,000 families had to relocate because of the project but, after the inconvenience, most appreciated the bigger and better-quality houses, as well as the access to electricity. “Most had to move only a short distance, and many said the compensation was more than expected,” says Wang Zhuoxian, deputy general manager of the Guizhou Shuibai Railway Corporation.

Construction of the project, for which most materials, such as stone, sand, and timber, were found locally, provided 5 million days of work for underemployed and poor people. The minimum wage of CNY500 ($60) a month lifted a family of four above the poverty line.

Besides bringing social change, the project will boost the province’s economy through the transport of coal and other commodities. Although Guizhou has a high incidence of poverty, it is rich in natural resources. The railway line runs through three major coal fields with reserves of more than 5 billion tons of high-grade, low-polluting coal.

Importantly, the line will be a new regional rail link, turning the area into a transshipment center. “It will cut hundreds of kilometers off present rail routes between northwest PRC and Fangcheng seaport in Guangxi Province and will alleviate current bottlenecks in the transport of coal from Guizhou to Sichuan and Guangxi and laborers from western PRC to Guangdong or vice-versa,” says Deng Shoubin, an engineer in the project management office.

“The project will boost the province’s economy through the transport of coal and other commodities … [and] is expected to open up Guizhou’s spectacular natural assets to tourism.”
Nearly 40% of the population in western Guizhou are from minority groups. Until recently, they had no access to electricity, basic health services or education.

Furthermore, says Deng, the railway is expected to open up Guizhou’s spectacular natural assets to tourism. He cites, as examples, the underground karst caves, beautiful lakes, and the famous Huangguoshu waterfall.

Last, but not the least, the project is also strengthening the capacity of the Guizhou Shuibai Railway Corporation, including its management information and financial accounting services.

Reform has been a key element of ADB railway projects, notes ADB’s former principal project engineer Randhir Soin, who administered all 10 of ADB’s railway projects in the PRC, including the Guizhou Shuibai line, before he retired earlier this year. The reforms, says Soin, have emphasized cost recovery and have helped to nudge the country’s vast railway system toward self-sufficiency.

As the new line in remote Guizhou has shown, ADB’s railway projects have helped to provide the transport infrastructure that enables the poor to participate in the economic mainstream and be lifted out of poverty.

Project Information
Guizhou Shuibai Railway Project (1998)
Financing: $105 million, ordinary capital resources (ADB); $215 million, borrower financed; $72.6 million, other external financing
A model build-operate-transfer water project passes its crucial first test as the PRC encourages foreign-financed deals

By Ian Gill

FROM THE ARCHIVES: This story was first published in May 2002.
In February 2002, the People’s Republic of China’s (PRC) pioneer build-operate-transfer (BOT) water supply venture completed its difficult first stage of construction—on schedule and within budget.

Since then, the project, supported by the Asian Development Bank (ADB), has operated smoothly with a new treatment plant supplying drinking water to Chengdu’s distribution network through a 27-kilometer pipeline. The plant is supplying almost 400,000 cubic meters a day.

“The first step of construction was very successful and there has been good cooperation between the two sides,” says Lin Jianguo, general manager of Chengdu Municipal Waterworks General Company, the local utility that is buying the water from the joint venture company, Chengdu Generale des Eaux–Marubeni Waterworks Company (CGEM). CGEM is owned 60% by France’s Vivendi Water and 40% by Marubeni Corporation of Japan.

Success for the pilot project is important to the PRC as it encourages foreign firms to participate in the construction and management of its urban infrastructure, including water facilities. The BOT arrangement—under which a foreign consortium builds and operates a facility for a number of years before transferring it to the local government—is one of several modalities being tried by the PRC. Others include licensed, leased, and contractual modes.

The Benefits of BOT
ADB is backing the project because “It’s part of our strategy to promote greater private sector participation in the development of infrastructure facilities in the PRC,” says Alfredo Pascual, director of ADB’s Private Sector Infrastructure Finance Division.

For the Chengdu government, the benefits include the transfer of management and technical skills and, after 18 years, the water treatment plant that has been fully funded by foreign investors. Of the project’s total cost of $106.5 million, 30% is being funded by the French and Japanese partners and 70% by a group comprising ADB, the European Investment Bank, and five commercial banks. ADB is providing a $26.5 million loan and cofinancing of $21.5 million.

For their part, the French and Japanese firms receive a commercial return on their investment and increase their exposure in the world’s largest emerging market.

The PRC has benefited from modern management techniques, says Michael Smart, the British general manager for CGEM during the 2 1/2-year construction phase.

“They have learned from detailed programming, continuous cost/budget monitoring and control, and close project coordination,” says Mr. Smart. “For example, we were told the pipeline was to go under a ring road rather than alongside it and...
that would have added $3 million to the cost. Under the old way, the budget would have simply been expanded, but we looked hard at ways to cut elsewhere and got the extra cost down to $800,000.”

**Switching to Piped Water**
The Vivendi Water plant was built according to rigorous international standards using advanced technologies to treat water cost-efficiently, says Jean Francois Papet, who took over as general manager after construction. Examples of technical innovation include high-speed sand filters in the plant and the use of spiral-welded pipes, which allowed for fast assembly of the pipeline. The plant is fully automated, and employs half the number of staff employed in a nearby Chinese plant that has more 1½ times more capacity.

Papet strongly rejects local press reports that the “French water” is purer and more expensive than locally produced water. “It was not part of the deal, nor our intention, to produce better quality water than that of the local authority,” he says. “Our water has a lower turbidity, as was required, but otherwise is of similar quality to the local water.”

Chengdu was chosen by the central government to host the BOT project partly because the city forecast a significant increase in its need for piped water. When the project was awarded in 1998, the authorities estimated that demand for water from its industry and 3.2 million residents would continue to increase at nearly 7% annually.

A slowdown in growth has meant, however, that demand is still about 1.1 million cubic meters a day, instead of a projected 1.4 million. However, the authorities are confident that demand will catch up with projections within the next 3–4 years.

“The Vivendi Water plant was built according to rigorous international standards using advanced technologies to treat water cost-efficiently.”
that industry currently uses 400,000 to 500,000 cubic meters a day of groundwater, which some believe to be unsustainable even with the mountain province’s abundant supply.

**Paying for Water**

Many residents outside the third “ring road” will be happy if they can one day receive piped water.

In Gulan village, a few kilometers outside the ring road, cabbage farmer Liu Xinfeng says her 6-meter-deep tube well has been dry since a factory was built nearby, and she has to depend on neighbors for water.

Her neighbor, Zhang Shifang, has a deeper tube well and still receives water from it, but worries if this will continue when the factory begins operations. She would welcome piped water in principle but worries about its cost, noting that farm people consume much more water than city dwellers.

In Pi County, a suburb of Chengdu, factory owner Yang Qihui says he is being charged for groundwater by the local authorities but is happy to pay. Water accounts for only a tiny fraction of his total cost and, as a former farmer, he shares official concern about depleting the region’s groundwater.

The Chengdu BOT project so far is living up to the reputation it won after garnering international awards in 1999 as a legal, infrastructure, and project finance deal.

**Project Information**

Chengdu No. 6 Water Plant (1999)

**Financing:** $21.50 million, Complementary Financing Scheme; $26.50 million, Private Sector Loan
Reviving a Historic Waterway

Once smelly and black with pollution, a “grandmother” river is being revived in Shanghai

By Ian Gill

"The environment has greatly improved," says retired teacher He Mo, whose apartment overlooks Suzhou Creek.
Not long ago, Shanghai’s Suzhou Creek was a black, stinking river. Today, more than halfway through a $1 billion clean-up, the river is free of stench and its color has changed to gray.

Suzhou Creek is now clean and attractive enough for people to hold wedding ceremonies on platforms over the water, for families to relax in new recreational areas along the embankment, and for small stores to open up alongside the river.

Formerly called the Wusong River, the waterway is closely tied to Shanghai’s historical development from a fishing village to the biggest port in the land. It is affectionately dubbed the “grandmother” river because of its many tributaries, which once included the Huangpu River, though today the roles are reversed.

Suzhou Creek links Shanghai with the mighty Yangtze River, which flows the breadth of the People’s Republic of China (PRC) from the Himalayas. Starting from Taihu Lake in the Yangtze River Delta, much of the 125-kilometer-long river flows through Shanghai, a major industrial and commercial center with a 13 million population. Along its winding route, the river used to receive large discharges of untreated agricultural, industrial, and municipal wastewater.

This included waste from Shanghai’s nightsoil collection system and septic tanks and posed a major health hazard. Statistics from the Shanghai Municipal Sanitation Bureau show that the incidence of viral hepatitis and dysentery—leading water- and sanitation-related diseases—was nearly 10% higher in the project area than for Shanghai as a whole.

**Rejuvenated River**

All this has changed under the Suzhou Creek Rehabilitation Project, which is partly financed by a $300 million loan from the Asian Development Bank (ADB). “This is Shanghai’s largest project, which combines wastewater treatment with environmental improvement,” says ADB project engineer In-Ho Keum.

Already, a vast system of sewers intercepts wastewater before it reaches the Creek. Aided by pumping stations, the wastewater is currently diverted to the Yangtze River, but soon it will be cleaned by a 400,000 cubic meters a day-capacity treatment plant that is due for completion by the end of next year. Flow control structures, including locks and gates, now prevent pollution from its 60-odd tributaries from entering Suzhou Creek.

Another major source of contamination—factories and night soil collection wharves—have been relocated or dismantled. In addition, river traffic, once open to all—elderly people can remember the clusters of sampans permanently located around Garden Bridge—is now restricted to essential craft.

As a result of all these measures, some small fish are surviving in the rejuvenated river, and the aim is for marine life to flourish in large numbers by the time the project is completed in 2004.

Shanghai residents, especially those directly affected by the river, are pleased with the Suzhou Creek’s facelift.

He Mo is a 79-year-old former teacher who has been living for 45 years in a building overlooking Suzhou Creek a few hundred meters from Garden Bridge.

“I remember when people used to swim there,” she says, pointing from her balcony. “Then with all the factories in the 1960s, the water became polluted and there was such a bad smell that we didn’t open the windows, even in summer. In the past few years, the wharves have been removed and the green plants put in and the environment has greatly improved.”

Further down Guangfu Road in Zhabei district, Shen Qinkang, 52, runs a small general store.
“Shanghai’s Pudong area has grown into a hub of finance, trade, and shipping in 10 years, but we have also paid great attention to the environment.”

with his wife. Mr. Shen has lived in this area since childhood and says, “When the river was black and stinking, with lots of flies and mosquitoes, it was impossible to have a shop here. But things have improved and I opened my store in 2000.”

Balancing Act
The task of keeping the river clean has also changed. Garbage is collected mechanically by special barges instead of being scooped out of the river manually. During a trip on a garbage collection barge, Chen Xiuming points out that today’s refuse consists largely of water hyacinths, Styrofoam boxes, and plastic bottles.

The barge pauses at Zhongtan district, where the embankment has been rebuilt and an area turned into a grassy recreation area.

Cao Longjin, the President of the Shanghai Suzhou Creek Rehabilitation and Construction
The river’s foreshore is now a popular place for families to gather. (Right) Garbage is now collected mechanically by special barges that routinely patrol the river.

Company, says that upgrading the embankments helps control floods, as well as improve the environment. He points to the dilapidated wall on the other side of the river and says that, too, will be rehabilitated in time. Mr. Cao adds that the landscaping at Zhongtan has helped raise property values.

The Suzhou Creek project reflects how Shanghai is dealing with the challenge of balancing development with environmental protection.

As Jiang Sixian, Secretary-General, Shanghai Municipal People’s Government, says, “Shanghai’s Pudong area has grown into a hub of finance, trade, and shipping in 10 years, but we have also paid great attention to the environment. We cut down the use of coal in Shanghai, and we restructured our industrial and energy sectors, moving or shutting down polluting firms and promoting cleaner enterprises. ADB has been our partner in developing Pudong by helping to build the Nanpu and Yangpu bridges that link the area with the rest of Shanghai. Now, ADB is assisting our environmental effort by rehabilitating Suzhou Creek.”

Project Information

Suzhou Creek Rehabilitation Project (1999)

Financing: $162.10 million, ordinary capital resources (ADB); $679.20 million, borrower financed
From Waste to Energy

Technology that can turn animal waste into gas is changing daily life for the better in rural PRC

By Lei Kan

XIYING, SHANXI PROVINCE

The life of Zhang Jianfen has improved dramatically since 2004. That was when the 38-year-old from Xijing village in Shanxi Province, People’s Republic of China (PRC), switched from using a coal-burning stove to a biogas-fueled oven to cook for her family of seven. Her cough disappeared, her eyes no longer burnt and, she says, the efficient new oven meant she spent 10 fewer hours a week in the kitchen. That time is now spent on more relaxing pursuits: a conversation with a neighbor, watching TV, or even an afternoon nap.

Ms. Zhang is one of thousands of villagers in the PRC who have benefited from the Efficient Utilization of Agricultural Wastes Project, supported by a $33.1 million loan from the Asian Development Bank (ADB).

“Our project has made a tremendous difference to women. It is a custom in many of these areas for women to do all the cooking,” says Yue-Lang Feng, ADB’s lead natural resources specialist. “Switching from coal to biogas reduces the household drudgery of women.”

The project covers the rural areas of Henan, Hubei, Jiangxi, and Shanxi provinces. Its aim is to increase usage of biomass-based renewable energy systems that will improve the environment and promote local economic growth.

In the PRC, large quantities of agricultural waste is disposed of inappropriately. Crop waste is often burnt, and animal waste is left to rot. These practices can be harmful to the environment, and also constitute a loss of potential energy and nutrient

The project aims to increase usage of biomass-based renewable energy systems that will improve the environment and promote local economic growth.
• Using biogas instead of coal for cooking reduces the workload for women in the kitchen.

resources, which could add value to an integrated farming system, reduce farm input costs, provide opportunities for integrated pest management, and implement organic farming techniques.

Generating Biogas
The Xinming Pig Breeding Co., Ltd. is a private enterprise that operates an intensive pig farming business. In 2007, with the support of an ADB-financed project, the company built a large-scale biomass gasification plant with an annual capacity of 210,000 cubic meters and constructed distribution pipelines to the nearby Xiying village.

The company began supplying free biogas to 100 households as part of a trial run in 2008. Soon it will build a new biomass plant able to process waste from 9,000 pigs, allowing the company to supply biogas to about 500 households.

Liu Koumei, 50, is looking forward to the day when her house is connected. She also lives in Xiying village—on the opposite side of town from Zhang—but missed out on the initial trial. Coal sits in a pile of one corner of her yard. Her stove is outside too, which keeps the coal dust out of the house, but makes cooking a challenge when it rains or the wind blows.
“It takes me more than an hour to cook a meal for six people,” said Ms. Liu, who lives with her husband, two children, and two grandchildren. “Cooking for me is definitely not a joy.”

**Best Practice**
Liu Wenyong, deputy director of the project management office, says the government has adopted some of the best practices gained from this project. The Ministry of Agriculture is now implementing the promotion of biogas in rural areas nationwide.

Zhang Weimin needed little convincing. When he heard of biogas plants in other villages he quit his “iron rice-bowl” job as director of Daying village and started a private pig-farming company, Weimin Husbandry Cooperative, to supply biogas to his own village of about 500 households.

Meanwhile, 56-year-old farmer Fan Sanshu from Shanxi Province is reaping the benefits of growing organic tomatoes in a greenhouse heated by methane gas in winter and early spring, and fertilized with the sludge and effluent deposits from a biogas digester.

The digester, built between a pigsty and the greenhouse, is fueled by the manure of six pigs. The biogas generated from this on-farm digester is sufficient for the Fan family to cook three meals a day and light the 200-square-meter greenhouse with gas lamps.
Experts and associations are invited to teach farmers new techniques for growing organic vegetables, fruit, as well as household plants and flowers.

The tomatoes are in demand in urban areas, and fetch a higher price than conventionally grown tomatoes. Fan estimates that his income has increased 50% since the project began in 2006.

Training Programs
The project attracted a $6.4 million grant from the Global Environment Facility to finance training programs and technical services for farmers and households. Under the project, experts and associations are invited to teach farmers new techniques for growing organic vegetables, fruit, as well as household plants and flowers. The project also helps the farmers develop markets by promoting organic food to urban dwellers nearby.

Maintaining the project’s financial sustainability is important to ADB. “We give the farmers the seed money for their business to grow and provide training and help so that the farmers have access to the market. We always believe that our job is to help the poor help themselves,” says Ms. Feng.

From 2002 to mid-2009, the local project management office has conducted 83 training courses for more than 350 skilled workers and technicians on biogas operations, more than 8,000 farmers on household financing and cultivating and breeding, and over 400 promoters for biomass utilization.

“If you just build facilities for them and don’t teach them how to use it, they will soon lose interest and the intention to use them. Then the project will die. This is what we’ve learned from this project,” says Liu Wenyong. “Only if you provide training and update the farmers with new farming knowledge, and show them the benefits they can get from it, will they keep going with you. Farmers are very practical.”

Project Information
Efficient Utilization of Agricultural Wastes
Project (2002)
Financing: $32.78 million, ordinary capital resources (ADB); $44.52 million, borrower financed; $6.25 million, Global Environment Facility (GEF)

- A worker manufactures biogas at a pig farm.
- Sludge and effluent are reused from biogas facilities and used as plant fertilizer.
A project that captures and uses methane that would otherwise be released into the atmosphere during the mining process is set to become a model for thousands of coal mines across the PRC

By Lei Kan
Wei Jiusheng drives a methane-powered taxi and earns CNY3,000 ($440) a month, substantially more than most drivers in his city. When Mr. Wei drove on gasoline, he said, filling the fuel tank was so costly he was barely able to support his wife and child. When he learned that he could save money by using methane gas, Mr. Wei, 27, converted his old car.

To reduce air pollution and promote the use of methane gas, the municipal government later made it mandatory for all taxis and buses in Jincheng to be converted to bi-fueled vehicles, with gasoline to be used only as a backup fuel.

Many owners of private vehicles have also switched to bi-fueled cars because this cuts their fuel expenses in half.

**Transforming Methane**
The People’s Republic of China (PRC) is the largest coal producer and consumer in the world, getting more than 70% of its energy from coal. Coal is the dirtiest fossil fuel and a major cause of methane gas emissions—a greenhouse gas 21 times more potent than carbon dioxide.

**JINCHENG, SHANXI PROVINCE**

We capture methane gas, one of the most abundant greenhouse gases, from coal beds in Jincheng, Shanxi Province.
In the PRC, more than 13 billion cubic meters of methane are released into the atmosphere each year. As a result, about 60% of cities do not meet minimum standards for air quality, and acid rain falls on about a third of the country.

Methane gas is found naturally in coal beds. But it is highly explosive: every year at least 5,000 miners die from mining accidents in the PRC, mainly caused by methane explosions. To keep working conditions safe, methane needs to be drained during, and sometimes before, underground coal mining operations.

When captured, methane is a clean energy source: its use does not produce soot or lead to acid rain; it has the highest energy content of all fossil fuels; it is the main constituent of natural gas, one of the cleaner energy sources; and its use can replace the burning of coal, wood fuel, synthetic waste gas (a low-energy mixture of coal and biomass or municipal waste), and petroleum-based fuels.
The removal of methane from coal mines increases coal mine safety and efficiency, reduces greenhouse gas emissions, and improves air quality.

**Using Methane Efficiently**

To meet the government’s commitment to address climate change by developing clean and renewable energy as an alternative to coal, the country’s Eleventh Five-Year Plan (2006–2010) aims to cut pollution by 10% and reduce energy intensity by 20%.

But the question is: What will be the most efficient way to do so?

In 2004, the Asian Development Bank (ADB) approved a $117.4 million loan for the Coal Mine Methane Development Project in Jincheng to demonstrate how new technologies can increase the production and use of methane.

Jincheng is one of the major “coal cities” in Shanxi Province, and its coal mines are rich in methane. This is called coal mine methane (CMM) when released into mine shafts by underground coal seams during mining operations, and coal bed methane when released through bore holes drilled from the surface into underground coal seams.

The ADB-supported project captures and produces CMM for a 120-megawatt power plant. It is the world’s largest methane power plant, which transmits and distributes CMM to residential, commercial, and industrial consumers in Jincheng. Coal bed methane is produced mostly for transport fuel supply.

By capturing methane, the project will reduce methane emissions by 265 million cubic meters, which is equivalent to 4.4 million tons of carbon dioxide emissions, and will save over 430,000 tons of coal per year, experts say.

In 2004, ADB approved a $117.4 million loan for the Coal Mine Methane Development Project in Jincheng to demonstrate how new technologies can increase the production and use of methane.
The project will benefit from the sale of carbon credits under the Clean Development Mechanism—an agreement under the Kyoto Protocol that allows industrialized countries with a greenhouse gas reduction commitment to invest in ventures that reduce emissions in developing countries as an alternative to more expensive emission reductions in their own countries. The sale of carbon credits under this mechanism will bring in an estimated total revenue of over $100 million by 2012, which can offset the cost of the power plant.

Consistent, Even Supply
Jincheng East Glassware Company, one of the industrial users that benefit from the project, upgraded its four furnaces from coal to methane gas in 2008. Each furnace saves the company about CNY1,000 ($147.05) per day, compared to the cost of burning coal.

“The more importantly, the production quality has improved as the temperature of furnaces has stabilized with consistent gas supply,” said Li Yuqing, general manager of the company.

The temperature of the methane gas-fueled furnaces fluctuates by only 10 degrees Celsius, while coal-fueled ovens fluctuate much more. As a result, said Li, methane gas ensures that the glass melts evenly, without creating imperfections, such as bubbles, in the glass. Also, due to the even burning of the methane gas, Jincheng East Glassware Company uses its raw materials 20% more efficiently, wasting less in the glassmaking process.

In addition, switching from coal to gas has improved air quality in the workshops, greatly reducing the incidence of respiratory disease.

The three-star Grant Guesthouse on the main street of Jincheng has replaced its coal-burning

The Jincheng East Glassware Company upgraded its four furnaces from coal to methane gas in 2008. Each furnace saves the company about CNY1,000 per day, compared to the cost of burning coal.
At the Jincheng East Glassware Company production quality has improved as the temperature of furnaces has stabilized with consistent gas supply. Boiler for heating and cooling with a gas-fueled boiler. It upgraded its kitchen equipment at the same time. These changes reduced costs, increased efficiency, and improved working conditions. Also, because they are better able to control temperatures, chefs do not have to worry about over- or undercooking their dishes.

According to Wang Keping, director of Jincheng Finance Bureau, CMM has been distributed to 80% of Jincheng households since the end of 2008. The average annual cost for gas supply is CNY350 ($51.47) per family, instead of CNY2,000 ($294.11) for coal. “It not only reduced households’ expenses, but also liberated women from time-consuming cooking,” Mr. Wang said.

Energy Impact: Taking the First Steps
According to the China Coal Information Institute, a government think tank, 4.3 billion cubic meters of methane were captured by coal mines in the PRC in 2007. Government incentives helped bring about this 26% annual increase in capture.

The Jincheng municipal government plans to cover the whole city with CMM distribution pipelines to supply over 60,000 households with gas for heating and cooking by 2011. It will also provide compressed gas products to other places as far away as Shenzhen and Hong Kong in southern PRC.

“The success of this project in Jincheng will not only have significant impact on climate change and improvement of miners’ safety and energy security, but also demonstrates the great effort of the central and local governments, along with corporate partnership, to work effectively together toward a common goal,” said Merlita Pajarillo, energy specialist in ADB’s Energy Division, East Asia Department.

This effort is only the first step. It will establish a model for thousands of coal mines across the country, leading to cleaner air and a better environment for the people of Jincheng.

Project Information
Financing: $117.40 million, ordinary capital resources (ADB); $20 million, Japan Bank for International Cooperation; $37.86 million, industrial commercial bank of China; $42.77 million, Jincheng Anthracite Mining Group Co. Ltd.; $8.66 million, Shanxi Energy Industries Group Ltd.; $9.81 million, Jincheng municipal government; $0.50 million, United States Trade and Development Agency
Saving Sanjiang Wetlands

A massive ecological preservation project is fighting to preserve the Sanjiang Plain wetlands, home to some of the richest biodiversity in the PRC

By Lei Kan

Baoqing, Heilongjiang Province

Forty-eight-year-old Song Yubo often patrols the Qixinghe National Nature Reserve in Heilongjiang Province, People’s Republic of China (PRC). It’s an important job. The nature reserve is part of the 10.89 million-hectare Sanjiang Plain, which contains the largest area of wetlands in the PRC. These wetlands—often referred to as nature’s kidneys—support about 37 ecosystems, 1,000 species of plants, and 528 species of vertebrate fauna, including 23 of the globally threatened species on the World Conservation Union Red List. Ten of those threatened species are waterfowl, such as cranes, storks, and swans, which require extensive, undisturbed wetlands during their migration and breeding seasons.

Little wonder, then, that Mr. Song does everything he can to protect this rich ecological treasure as part of an Asian Development Bank (ADB)-supported government project to preserve the wetlands, which are disappearing at a rapid rate.

“In the core zone of our nature reserve, farming activities are not allowed; otherwise, we would not be able to prevent hunting, egg collecting, and fishing from happening,” said Mr. Song, deputy chief of the Qixinghe National Nature Reserve Management Bureau.

Loss of Wetlands

Since the 1950s, the fertile soils of the Sanjiang Plain have been transformed from wetlands into the PRC’s food bowl, with much of the country’s grain grown in this area. In that time, the wetlands have shrunk by about 75%, from 3.7 million hectares to 0.92 million hectares in 2000.

Given the region’s importance to the country’s food security strategy, the central government is aware of the deterioration of the aquatic systems. As a result, in 2002, it approved the National Wetland Conservation Action Plan, which outlines the conservation and land management guidelines. Despite the impressive legal steps,
however, wetland restoration and protection are still new concepts in the PRC. Wetland restoration programs have been planned, but sound wetland management expertise and scientific knowledge are scarce.

The Sanjiang Plain Wetlands Protection Project—a massive ecological preservation project—began in 2005. It is designed to protect the natural resources of the Sanjiang Plain wetlands and its watersheds from continued man-made threats, and promote sustainable use of natural resources through integrated conservation planning. At the same time, the project aims to improve the well-being of local communities in 13 of 23 counties of the Sanjiang Plain.

ADB approved a loan totaling $15 million in 2005 to support this project and, in addition, assisted the Heilongjiang provincial government in the allocation of a $12.14 million grant from the Global Environment Facility. The project is expected to cost about $55 million in total and will be completed in August 2012.

**Social Protection**

Farmland-to-wetland restoration required the relocation of farmers and herders from vulnerable areas in the Sanjiang Plain. A major challenge of the project is to relocate people without hurting their livelihoods. ADB and the government have ensured that people affected by the wetland reversion were provided compensation, resettlement, and an ecologically sustainable alternative livelihood to ensure lasting benefits for both the environment and affected people.

Wang Lansheng, 65, and his wife are farmers in Baoqing County, an area included in the Qixinghe National Nature Reserve. “The village collective gave us better land that is richer and closer to our house,” said Mr. Wang, adding that the couple now earns over CNY100,000 (about $14,925) a year growing soybean and corn.

In the late 1960s, land owned by the Wangs in the wetlands was essentially useless. The Wang family, with their bulls and equipment for farming, could only get to their field during the winter after the water froze. During the remainder of the year, they worked their land, surrounded by water, barely earning a living from the often flooded field.

With the increased income, Mr. Wang and his wife bought an apartment in the county seat. “During the weekend, we live in the apartment,” said Mr. Wang, “And our three children come to visit us.”

**Innovations for Sustainability**

In this project, several other models for ecologically sustainable alternative livelihoods are also being tested, including greenhouse farming in the Qixinghe National Nature Reserve, which can earn returns about 40 times higher than traditional farming. The Qixinghe Nature Reserve Bureau will construct greenhouses and lease them to farmers, an effort to earn money that will be used for wetland protection.

The Qixinghe National Nature Reserve Management Bureau will also construct biomass
Saving Sanjiang Wetlands

Plants and sell clean and low-cost energy to users. Biomass plants will also contribute to the reuse of agricultural waste and other environmental improvements. Beyond Qixinghe, pilot eco-tourism projects will also be conducted in several other nature reserves.

“Environmental protection needs understanding and support from the local people, especially the affected ones,” said Yoshiaki Kobayashi, water resources specialist with ADB’s East Asia Department. “Educating the communities is an important part of the project.”

This project allocated financial resources for education and capacity building. As one of the major components of the project, the Qixinghe National Nature Reserve Management Bureau provides training programs for educating teachers and students; building staff capacity; and increasing communities’ participation in and awareness of biodiversity, wetlands, wildlife, and nature conservation. Similar activities are also being conducted in other nature reserves.

“We understand the importance of the wetland conservation and support the government’s efforts on this,” said Mr. Wang, “because we are directly affected by climate change.”

Making the Commitment

Today, the PRC has protected 17.95 million hectares of natural wetland, accounting for 49.6% of the total area of wetlands in the country. The country has also attracted foreign funds of about CNY200 million (over $30 million) to support wetland protection, recovery, and capacity building.

Thanks to these efforts, by mid-2010, the PRC had established 550 wetland nature reserves, launched 700 national wetland park pilot projects, and designated 37 major wetlands of international importance, protecting over 2.7 trillion tons of fresh water.

Project Information


Financing: $15 million, ordinary capital resources (ADB); $12.14 million, Global Environment Facility; $24.37 million, Heilongjiang provincial government; $4.04 million, county governments
From Clean Water to Green Energy

Two new hydropower plants in northwest PRC are providing clean, efficient energy to rural farming and herding families

By Lei Kan
Before a stable supply of electricity arrived in his village of Bajiaowan in 2006, Chang Xingmin, a farmer in the remote Gansu Province in northwest People's Republic of China (PRC), spent almost as much time traveling on the roads as he did working in his fields.

“Before, we had to transport grain by horse and cart to a distant township for processing,” said the 45-year-old father of two. “It took 2 days for a round trip. It was very time consuming and costly.”

These days, Mr. Chang can get his rice processed in the village of Bajiaowan, a short distance from his farm. And his wife can now use modern electrical appliances, such as a refrigerator, freezer, washing machine, and an oven, to help ease the daily toil of life on the land.

“We used to kill a sheep and had to finish eating the whole sheep within a couple of days,” says Mr. Chang. “Now, with the freezer, we don’t have to worry about the meat spoiling.”

**Nature’s Power**

These improvements are primarily due to the Asian Development Bank (ADB)-funded Gansu Clean Energy Development Project, which built a hydropower station along the Heihe River Basin and connected Bajiaowan to the electric power grid.

* Hydropower is the cheapest way to generate electricity in the mountainous Gansu Province.
Transmission lines dominate the landscape in remote Gansu Province.

Hydropower is the cheapest way to generate electricity in the area today. In the mountains, water is readily available. Once a station has been built and the equipment installed, the energy source—flowing water—is virtually free. The only costs are for the maintenance and the operation of the generation stations.

Engineers control the flow of water through the turbines to produce electricity on demand, making hydropower not just the cheapest but the most efficient energy source as well. While the best fossil fuel power plants are only 50% efficient, modern hydro turbines convert as much as 90% of available energy into electricity.

Hydropower is also a clean and renewable energy source. It does not emit harmful greenhouse gases or local air pollutants, and so does not harm the local or global environment.

**Investment Program**

Zhangye City is located along the midstream of the Heihe River. Known as the “Golden Zhangye” for its picturesque scenery and rich cultural traditions, in the past the city connected the Silk Road with the Eurasian continental bridge.

Its economy was based on farming and animal husbandry. However, with industrial development, the city’s agriculture sector declined, and Zhangye faced electricity shortages.

While the best fossil fuel power plants are only 50% efficient, modern hydro turbines convert as much as 90% of available energy into electricity.
Based upon the successful implementation of the Gansu Clean Energy Development Project, in 2006, ADB approved a loan of $50 million to assist the Gansu Heihe Rural Hydropower Development Investment Program, which is supporting the construction of two hydropower stations on the Heihe River Basin, namely, the Erlongshan and Dagushan hydropower stations.

The power stations will help solve the power shortages in the Zhangye area. Upon completion, the two hydropower stations are expected to generate a total of 400 million kilowatt-hours a year and reduce greenhouse gas emissions by 318.6 thousand tons a year.

Cost Saver
The Chang family now pays about CNY200 ($30) per year for electricity, less than half than they used to pay. The average income in Bajiaowan has increased from CNY3,000 to CNY5,000 ($450–$750) because electric tools have improved productivity.

Because of the significant greenhouse gas emission reduction from replacing coal-fired power plants, these hydropower projects were registered under the Clean Development Mechanism (CDM), an incentive mechanism under the United Nation's Framework Convention on Climate Change to promote clean energy projects in developing countries. CDM-registered projects can sell their certified emission reductions to generate additional revenue. The Asia Pacific Carbon Fund, a fund established by ADB in November 2006, contracted the certified emission reductions for one of the projects. These two hydropower stations earn additional income of CNY30 million ($4.41 million) annually.

Leading the Way
Hydropower, a mature and commercially competitive renewable energy, plays an important role in the PRC’s energy mix and will play an even bigger role, with more than 300 gigawatts of new capacity expected by 2020.

“The Gansu Heihe Rural Hydropower Development Investment Program provides a good model for developing rural hydropower in the PRC,” said Ashok Bhargava, director of the energy division of ADB’s East Asia Department. “These projects exemplify how development of renewable energy in remote rural areas can bring economic development to local communities in an environmentally sustainable manner.”

By the end of 2008, the PRC had built 45,000 small hydropower plants with their installed capacity and annual power generation accounting for one-third of the total hydropower produced in the PRC.

In 2009, the Ministry of Water Resources announced that hydropower has become an important part of rural infrastructure and a critical means of protecting the environment. Developing hydropower has been put at the top of the country’s agenda.
Spreading the Message

An awareness-raising program developed in Africa—and transplanted to the PRC with the support of ADB—aims to halt and reverse the spread of HIV/AIDS.

By Lei Kan

LINXIANG, YUNNAN PROVINCE

Behind her engaging smile, Li Lun represents a potent new weapon in the People’s Republic of China’s (PRC) battle against HIV/AIDS.

Going from hill to hill, door to door, in Linxiang District, Lincang prefecture of the mountainous Yunnan Province, Li Lun is on a mission to mobilize people to take control of the risk of HIV/AIDS in their lives, in the lives of family members, and the community as a whole.

Sometimes walking 3 hours to reach a village deep in the mountains, Li Lun says she is just “trying to make her life more meaningful.”

She is not alone. Li Lun, a former rural doctor who managed her own small clinic, is a member of the grassroots HIV/AIDS awareness and prevention program Total Control of the Epidemic (TCE), a scheme developed by international nongovernment organization (NGO) Humana People to People (HPP).

Traditionally, inhibitions in Chinese culture regarding discussing sexual topics have limited how parents discuss the topic with their children and how comfortable adults feel about seeking information. Before beginning their intensive grassroots work, TCE field officers receive a 1-month training course and in-field practice, equipping them with skills to talk about safe sex and HIV/AIDS with people in their areas. This training is crucial to the success of the project.

The TCE model (developed by HPP in Africa) has been adapted to the PRC context and piloted in Yunnan in cooperation with the
Asian Development Bank (ADB) through a subproject on Sustainable Networks for Local HIV/AIDS Prevention under an ADB regional technical assistance for Fighting HIV/AIDS in Asia and the Pacific. The technical assistance is funded by the Government of Sweden. The implementing agency is a joint project office managed by the Foreign Capital Project Management Center of the Yunnan Poverty Alleviation and Development Office and HPP. Other partners include the China Preventive Medicine Association (CPMA), and provincial- and local-level poverty agencies and bureaus of health, family planning associations, and women’s federations.

Since end of March 2007, Li Lun has visited more than 1,000 homes, talking to about 5,000 people, making a difference in the community where she grew up.

Lincang prefecture is located in southeast Yunnan, a critical border area between the PRC and Myanmar for an epidemic that knows no boundaries, and consists of eight counties with 17 minority groups. Lincang is a major entry point for smuggling of drugs (a major risk factor in the HIV/AIDS epidemic) into the PRC. By the end of 2006, there were 3,637 registered people living with HIV/AIDS among Lincang’s total population of 2.2 million. Last year, 48% of new infections were transmitted sexually and 33% through blood, mainly needle sharing.

The government has increasingly recognized the need for decisive action to avert a spiraling epidemic. However, gaps in fiscal and human resources—especially at lower levels like counties and villages, and in poorer areas—pose key constraints. New initiatives and cooperation models are needed to turn back the spread of HIV/AIDS.

“Particularly since late 2003, the Government of the PRC has taken concerted action to address HIV/AIDS, with support from the highest levels of leadership,” says Chris Spohr, a social sector economist at ADB’s Resident Mission to the PRC. “At the same time, the front line in this battle is communities and individuals, who are often hard to reach via the state’s own resources.”

Li Lun has visited more than 1,000 homes, talking to about 5,000 people, making a difference in the community where she grew up.
While there are limitations to purely grassroots approaches, including challenges for sustainability and scaling up such projects, Mr. Spohr says this project takes new approaches to tap civil society as a partner within government-led efforts.

The TCE model is premised on the idea that “only people can liberate themselves from the epidemic.” The Lincang pilot adopts an interactive approach, delivering services to the general population by engaging local field officers to mobilize, educate, and train local communities.

“Their approach is widely welcomed by the public, especially the high-risk groups, such as sex workers, intravenous drug users, and migrant workers,” said Zhou Zhuangsheng, director of Lincang Poverty Alleviation and Development Office. “These people are able to tell their personal concerns to the field officers without feeling embarrassed.”

Dr. Cai Jiming, vice president and secretary general of CPMA (a Beijing-based NGO working with ADB here in Yunnan and a sister pilot in Xinjiang), agreed, saying: “Chinese NGOs are an indispensable component in the HIV/AIDS prevention and control on the mainland, and have effectively dealt with many sensitive health education areas that government authorities have felt reluctant to handle directly.”

Such pilots are not alone. According to a China Daily report, the PRC’s launch last December of a first round of public service announcements to promote the use of condoms and safe sex to fight HIV/AIDS marked a key new approach, with three video clips using well-known Chinese celebrities hitting screens in airports, buses and trains, and on the Internet.

The latest figures from the Ministry of Health show that unsafe sex is the main mode of transmission for HIV. The PRC now has 700,000 people living with HIV/AIDS, up from about 650,000 in 2005. More than half the estimated 50,000 new HIV infections last year were reportedly infected through unsafe sex. A majority of the cases involved those aged 20 to 39 years old.

Initiatives, such as the ADB-supported pilot in Lincang, aim to help stem that tide by assisting the PRC to explore new ways to mobilize civil society in the battle against HIV/AIDS.

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**Project Information**

HIV/AIDS in Asia and the Pacific (RETA) (2006)

**Financing:** $8.67 million, Cooperation Fund by ADB and the Government of Sweden
Providing Clean, Clear Water

ADB’s water supply and sanitation project in Jilin is benefiting urban households and helping control pollution in rivers

By Jiang Zhuqing
Seventeen years is not a short period. Citizens in Meihekou City in northeastern People’s Republic of China’s (PRC) Jilin Province—one of the PRC’s poorer provinces, lagging behind in the provision of basic social services—must have never imagined that they would have to wait so long to satisfy their thirst for clean drinking water.

As early as 1991, the city’s government identified improved water supply and quality in Meihekou as a top priority. The citizens were faced with tap water that was smelly and foul tasting, especially in spring.

**Frequent Water Shortages**

“We used to buy barreled water to wash fruits and vegetables, brew tea, and cook meals because the tap water's quality couldn't be safely relied on,” says Wang Sulan, a 63-year-old retiree who heads a family of six. “Besides, the tap water was not supplied 24 hours a day, and we often sat up until midnight to collect a tank of water for washing clothes and taking baths.”

But lack of funds impeded the government’s efforts to construct the needed water plant and pipeline. “Frequent water shortages and poor water quality scared away potential investors and
Impact Stories from the People's Republic of China

Hampered the smooth development of the city,” notes Vice Mayor Bai Tiejun.

The situation remained unchanged until 2003, when a leadership group was set up by the city’s government to collect funds for the project.

On 19 July 2005, the Asian Development Bank (ADB) approved a $100 million loan package for the province to increase wastewater coverage, boost the supply of potable water, and improve management and use of water resources in the upper Songhua River Basin.

For Meihekou, ADB funded $14.62 million of the total CNY297 million ($43.4 million) needed to improve water supply and treatment. The Meihekou project includes a 40-kilometer water transmission pipeline from the Hailong Reservoir to downtown, running through seven townships and districts, as well as the construction of a water treatment plant.
While constructing the pipelines, constructors had to overcome difficulties caused by bad weather and price fluctuations on building materials. A Meihekou Water Treatment Plant was built to meet local residents’ demand of 100,000 tons of tap water per day and fuel the requirement in the city’s future development.

**Improved Tap Water**

“All 34 indexes of the tap water process have reached national standards, and citizens in Meihekou are assured of enjoying safe, clean, and quality tap water 24 hours a day from now on,” says Li Xiumin, an engineer of the water treatment plant.

The quality of the tap water is much better than that of the groundwater, which contains levels of iron and manganese dozens of times higher than the national standards, she explains. Ms. Li’s labs analyze the water and record water samples collected from the water resources, water treatment plant, and residents’ homes.

Meihekou’s situation is better compared with the overall water situation in the PRC, where more and more cities are beset by environmental problems and water shortage and deterioration.

According to estimates, the PRC suffers from an annual water shortage of about 60 billion cubic meters, with water supply not meeting the increasing demand in more than 400 of its 655 cities. At the same time, wasted water and untreated wastewater are ruining the PRC’s water resources in many cities.

As a countermeasure, ADB’s Jilin Urban Environmental Improvement Project is also expanding the inadequate wastewater treatment and sewerage system to its capital city of Changchun. The project will significantly reduce pollution in the Yitong and Yongchun rivers that flow into the Songhua River, while helping control floods from the Yongchun River.

Funded by ADB’s loan, a wastewater treatment plant has been established and expanded in Changchun to handle 390,000 tons of urban wastewater each day.

“Citizens in Meihekou are assured of enjoying safe, clean, and quality tap water 24 hours a day from now on.”
“After establishing and expanding the No.1 Wastewater Treatment Plant in a northern suburb of Changchun, we can treat more than 80% of the wastewater produced by the city before discharge,” says Duan Guoguang, deputy manager of the Drainage Company under the Changchun Water Affairs Group.

Of the 390,000 tons of treated wastewater each day, 290,000 tons is drained into the Yitong River, which is one tributary to the Songhua River that runs into the Russian Federation. The rest of the 100,000 tons will be further treated as intermediate water for a thermal power plant as cooling water.

“The water in the Yitong River was so dark and foul that no fish could live in it in recent years due to wastewater pollution,” says Qiao Hui, a farmer-turned-worker, who was busy installing equipment at the wastewater treatment plant.

**Drastic Improvement**

Water quality in the Yitong River has improved drastically after the wastewater treatment plant was put into operation more than a year ago.

“In the past, the paddy field was changed into a cornfield due to the water deterioration caused by the drainage of wastewater from the urban area,” says Sun Youcheng, another farmer-turned-worker, who lives in a small village along the Yitong River.

He says he had made a living on a 7-mu (0.5 hectare) rice field, irrigated by the nearby river water. “We also raised fish, but they were sparse, and we dared not sell the fish in the market because of the polluted water,” Sun says.

“The wastewater treatment project is helping to restore the paddy fields and fish again,” Sun says. He adds that the improved water quality enables his wife to raise more than 200 geese, chickens, and ducks at home.

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**Project Information**

GMS North–South Economic Corridor (2004)

**Financing:** Approved on $415,000, revised to $515,000, Japan Special Fund (JSF) and Technical Assistance Special Fund (TASF)

- Meihekou’s water treatment plant is meeting the demand of 100,000 tons of tap water per day.
Tea and Prosperity
Along Ancient Trade Route
When the Na sisters pick tea from their trees, they are maintaining a tradition and livelihood that has been passed down through their family for centuries. Tea is the bedrock of their income: Even though some of the trees are over a thousand years old, they have always represented a prosperous future.

“We have these trees from our ancestors,” says Guo. “They are our luck.”

In the far southwest of the People’s Republic of China (PRC), Guo and her sister Wa are part of the rich and ancient tradition of Pu’er tea, which has played an essential part of the history and development in this area. The constant commercial trade of tea along the routes of ancient southwest PRC and the Lao People’s Democratic Republic (Lao PDR) led to an entire 2,500-kilometer stretch of road being named Chamadao or the Tea Horse Road sometime during the Tang dynasty.

Today, much of the route still exists. Despite the exoticism of the Tea Horse Road legend, the road traverses some of Asia’s poorest areas. But a new Asian Development Bank (ADB)-supported road following the Tea Horse pathway has enhanced the region’s potential for economic growth.

Route 3, stretching from the PRC through the Lao PDR, allows the Na sisters to get their tea to wholesalers on a paved all-season road. Before, it was a backbreaking walk on a rough dirt path, tea-laden baskets on their backs. The ease and efficiency of the road has made business easier, bringing more profits for them and a stronger economy for their region. Motorbikes, a television, and a karaoke machine have all found their way into the Na household—items that the family could have only dreamed about before Route 3.

An ADB-supported road following the Tea Horse pathway has enhanced the region’s potential for economic growth

By Jason Rush
The road has not just improved the exotic tea trade. The extraordinary benefits of an all-weather road can be seen in health, education, tourism, quality of life, and entrepreneurialism.

“Route 3 has created a better quality of living for people in rural areas, who are often poor merely because they are so isolated,” says Kunio Senga, director general of ADB’s Southeast Asia Department. “That a road can improve quality of life for so many people is one of the great unsung stories of development work. The wide-reaching benefits that a well-built road brings to a village, a province, a country are quite simply, extraordinary.”

With three children in school, Khammy Sikhounsaeng has to work hard to make sure they complete their education. From his home in Luang Namtha Province in northern Lao PDR, he buys straw from local growers and bundles it up to sell wholesale across the border in the PRC.

The new Route 3 has made a substantial impact on Sikhounsaeng’s business. It has cut traveling time down by about 400%. A new streamlined customs process at the border allows Sikhounsaeng to trade more efficiently. As a result, the business’ profits have soared, and now the family makes about $1,200 a month—an excellent income for the area.

Entrepreneurs in Thailand have not been left out of the benefits. In Chiang Rai, day markets—always a central part of that northern town’s community—have boomed as goods from the PRC and the Lao PDR arrive more quickly and efficiently through Route 3.

Kriangrai Samsakultuda has a stall at Tesaban Market. He said that products from the PRC used to come to the market via Bangkok at higher price. Now they come down Route 3. “They get to us at a cheaper price,” said Samsakultuda. Soon, there would be a big distribution center in the Lao PDR, he said, which would be even better.

But a new road is not all about profits, although profits will often decide if children stay in school, and families can afford quality health care. With
“Route 3 has created a better quality of living for people in rural areas, who are often poor merely because they are so isolated.”
(Top) Goods from PRC and Thailand are now cheaper because of Route 3. (Right) Tea growers can now get their tea to wholesalers on a paved all-season road.

Impact Stories from the People’s Republic of China

hospitals more accessible because of paved roads, time—often a life or death factor—can be radically slashed off travel to medical assistance. “We used to have to walk to the health center, and it would take us over an hour,” said one village elder in rural Lao PDR. “Now on the motorbike, we get there in 10 minutes.”

Initiatives like roads do not, unfortunately, come cost-free. At Luang Namtha Provincial Hospital, new equipment and an ambulance funded by ADB may have benefited the medical staff who formerly struggled with few modern tools, but they have also been used for road accident victims, whose numbers are increasing. And with long-distance truck drivers now including Route 3 on their route, the potential for increased HIV transmission has also become a concern.

Despite these increased risks, most people are pleased with the new road. “There’s been an improvement across the board,” says Phanhthong Phiththoumma, vice governor of the province. “Socioeconomic development has significantly increased. The transport of goods and tourism has gone up.” Says Phiththoumma, there is more trade with the PRC and investment has significantly increased.

Like many along Route 3, the Na sisters and their family share in the benefits. They may say their ancient tea trees are lucky, but the new road has complemented their hard work, bringing them prosperity they never dreamed possible.

Project Information

Jilin Urban Environmental Improvement Project (2007)

Financing: $100 million, ordinary capital resources (ADB); $81.70 million, Changchun municipal government; $33.40 million, Yanji municipal government; $137.60 million, domestic commercial banks cofinancing
Impact Stories from the People's Republic of China: Partnership for Prosperity

The People's Republic of China (PRC) has achieved remarkable growth and development since initiating economic reforms in 1979. Sustained growth has fuelled unprecedented poverty reduction, with hundreds of millions of people lifted out of poverty in the past 30 years. The Asian Development Bank (ADB) is proud to have contributed to these accomplishments. The PRC has received a total of $22.96 billion in loans assistance since joining the ADB in 1986, making it the second largest ADB borrower and the largest client for private sector financing. This publication commemorates the 25th anniversary of ADB’s operations in the PRC.

About the Asian Development Bank

ADB’s vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region’s many successes, it remains home to two-thirds of the world’s poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.