

Project Name China-Fourth Rural Water Supply and (+)...  
Sanitation Project

Region East Asia and Pacific Region

Sector WR - Rural Water Supply & Sanitation

Project CNPE57352

Borrower(s) People's Republic of China

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#### 1. Country and Sector Background

In the past decade, China has made significant gains in rural water supply. Between 1985 and 1997, the number of rural residents with convenient access to improved water has more than tripled, to over 848 million, or 88.9 percent of China's 954 million rural people. Of these, approximately 407 million people (48 percent of those with access to improved water) presently drink piped water. The remaining 441 million (52 percent of those with access to improved water) use a variety of other sources, including handpumps, shallow and deep wells, and rainwater collectors. The preference of Chinese governmental agencies is for the development of piped systems because of the added convenience and the ease of controlling water quality.

Having access to an improved water source, however, is not equivalent to having access to safe water. While almost all piped water systems meet the government's standards for safe water quality, the same is not true for hand pumps and other systems. Only about 95 million beneficiaries of non-piped systems enjoy access to safe water. The remaining 346 million rural residents use water which is improved, but nevertheless still does not meet the standards of safe water.

Therefore, despite recent progress, more than 450 million rural Chinese continue to suffer from unsafe or insufficient water supplies. About 76% of these are individuals having access to improved water which does not meet the quality of safe water, while the remaining 24% lack access to any improved water source. Both of these groups face problems such as water sources with high pathogen loads due to fecal or other contamination; water with high

levels of naturally occurring fluoride, arsenic, or salts; growing industrial and agricultural chemical pollution; and seasonal water shortages.

In China, as in other countries, the lack of safe water correlates highly with poverty. Also positively correlated with poverty are behaviors that worsen water-related disease. Examples include failure to protect water sources from contamination, to boil water before drinking, or to wash hands after using the toilet and before preparing or eating food. As a result, many poor rural people suffer from common diarrheal diseases and helminth infections and, more rarely, dysentery, hepatitis, typhoid and cholera.

To maintain momentum gained during the United Nations "International Drinking Water Supply and Sanitation Decade" (1981-90), in 1991, China set 1995 rural water supply goals at: 35 to 50 percent coverage of drinking water meeting international quality standards, including 35 to 40 percent of rural residents receiving piped water supplies. Both goals were met and even more ambitious goals established for 2000. In its Ninth Five-Year Plan, the government announced its targets of providing piped water systems for 50% of China's rural population, and of providing safe water for 85% of all rural residents and 65% of those residing in China's poorest rural areas by 2000.

However, China differs from many other developing countries in that there is not a history of the central government providing large subsidies for the financing of rural water supply and sanitation. Instead, there is greater emphasis on self-reliance with rural people using their own contributions and resources to improve their water supply. This financing structure causes poor rural areas to accurately match their ability to pay with the proper type of systems and level of service. As a result, China is held up as a model for other developing countries. Support for capital costs for water supply is partially provided by the local and/or provincial government. However, this support cannot reach all poor rural areas, and multilateral and bilateral assistance is welcomed by the government.

Health problems caused by the lack of safe water are exacerbated by poor sanitary conditions in rural China. Traditionally, Chinese households collect human waste and transport it to the fields for use as fertilizer, often without further treatment. This practice will undoubtedly continue. The main objectives of sanitation improvements are therefore to improve the standard of latrines and to make reuse practices more hygienic. By 1997, 90 percent of rural households had some sort of household latrine, but most of these facilities are rudimentary at best: they provide temporary storage of wastes and are unprotected from flies and other insect vectors of disease transmission. Only 29 percent of the rural population use "sanitary" latrines, usually defined as latrines with full walls and roof, odorless and insect-free; an additional 27 percent, primarily in county towns, have access to composting latrines that promise high rates of pathogen destruction. The availability of public and school latrines is low, and they rarely meet the "sanitary" standard.

In recent years, China has made substantial progress in addressing sanitation issues. Since 1995, the number of households with "sanitary" latrines has nearly doubled. In the Ninth Five-Year Plan, the government announced the ambitious goal of establishing "sanitary" latrines for 40% of the rural population by 2000. Until recently, efforts by the National Patriotic Health Campaign Committee (NPHCC) to expand the use of improved rural latrines have

been decentralized, with most improvements left up to individual provinces or townships.

Nevertheless, the government has made a concerted effort to promote good health-related behaviors. In most rural areas, a network of NPHCC workers, Women's Federation representatives, Youth Leagues, local epidemic prevention stations, and schools have led health education campaigns encouraging a wide array of hygienic behaviors. That work, combined with a high literacy rate (even in poor areas), has led to widespread knowledge of many basic health behaviors, such as the importance of drinking boiled water.

However, actual behavioral change has been slow to follow, especially in poor areas where fuel may be scarce and understanding of the link between raw water or unwashed hands and diarrhea is tenuous. Thus, the problem is more one of the effectiveness of health messages than of their dissemination: health education in most rural areas provides little concrete information to link hygienic behavior to improved health, and most provinces still lack specialized health education training.

As a result, significant disparities exist between poorer and wealthier rural counties, both among and within provinces in China. While a number of wealthier and middle-income rural counties have experienced tremendous health-related benefits as a result of improvements in water supply and sanitation, poorer counties with more limited resources have yet to receive similar benefits and still require additional support in order to carry out the changes necessary for improved health gains.

## 2. Objectives

The proposed project aims to reduce the time and cost for people in poor rural areas to obtain clean, safe water supply, while improving related sanitation and health behaviors through education and pilot investments. The principal objective of the project is to provide access to safe, conveniently located water to 3.1 million poor rural people in Anhui, Fujian, Guizhou, and Hainan provinces, and to improve related water and sanitation practices. A supporting objective is to provide the water at the lowest possible cost and to ensure its sustainability through good maintenance and accounting practices.

## 3. Rationale for Bank's Involvement

The supply of clean water to rural people is a high priority of the Chinese government, and past experience shows extremely high willingness to pay by project beneficiaries. Even the poorer villagers have a proven good track record for long-term cost recovery; however, many poor villages cannot afford the upfront capital costs of constructing even modest systems. In China, there is little direct financing for the rural water supply and sanitation sector from the central government. Instead, rural people rely mainly on their own contributions to improve water supply. The IBRD loan / IDA credit and government counterpart financing will allow the beneficiary upfront capital contribution to fall from 100 percent to 25 percent of total investment, considerably broadening the number of villages able to invest in safe water supply. Bank involvement thus allows capital costs to be met on a long-term basis, with most villagers paying no more than 3 percent of annual income for access to safe water supply. Without the Bank's support, most

project villages would not be able to invest in the proposed water supply improvements by themselves. Bank involvement also ensures that water supply and treatment plants are more technically sound than might otherwise often be the case.

Moreover, the Bank can bring international experience to bear on the issues of health and sanitation education - issues which have been well-covered by China's mass education campaigns, but need to be more effectively implemented. Health messages may be better targeted and alternative sanitation designs may be proposed and implemented as a result of the Bank's involvement.

#### 4. Description

The project will comprise of the following for each of the three main project components:

**Water Supply:** Provision of safe water, suitably financed, to poor communities currently lacking such supplies. This will include both piped as well as non-piped systems (i.e. handpumps and rain catchments). Also, in order to ensure low-cost operation and project sustainability, the project will provide support for training of water system manager(s), operator(s), and accountant. Users will be expected to pay for the full cost of the water, net of government investment.

**Sanitation and Health Education:** Assistance to ongoing rural sanitation and health education efforts. This component would work with primary school teachers, village doctors, Women's Federation representatives, and public health systems in their efforts to improve water use and sanitation practices in the villages. It would support demonstration programs to increase use of improved latrines; the preparation of health education messages aimed at expanding the adoption of improved sanitation and hygiene practices among the target beneficiaries, primarily housewives, school-aged children and decisionmakers in households; and training of health education specialists in delivery of those messages.

**Project Management:** Support to increase project office capacity to provide services to beneficiary villages. This would include surveys and research on effective strategies to expand adoption of improved sanitation and convey health messages. It would encompass training in project management skills such as procurement, water supply technologies, water quality protection, and health message delivery.

#### 5. Financing

	Total ( US\$m)
Government	23
IBRD	16
IDA	30
Beneficiaries	23
Total Project Cost	92

#### 6. Implementation

Implementation Timetable:

Past Bank rural water supply projects in China have focused on building small, primarily piped water systems with an average life span of 15 years. Total project implementation time would be about 5 years. Approximately 10-15% of the water systems will begin construction in the first and fifth years, with higher proportions falling in the middle years. Based on experience under the National Rural Water Supply project (Cr. N027-CHA), each year's implementation cycle begins with consultations and village-level feasibility studies and the development of procurement lists; these annual work plans are consolidated at the national level and submitted to IDA/IBRD for review in the fourth quarter of each calendar year, for construction beginning the first quarter of the following year. This arrangement has proven quite satisfactory under the NRWS project, and allows ample time for discussion on any issues that may arise between the Bank and the borrower.

Project supervision would monitor impact with respect to the objectives and focus on key sector issues such as beneficiary participation in system design, water plant operator and accountant training, and socioeconomic and health impacts of the project. Bank Group experience with supervision of the Rural Water Supply and Sanitation (RWSS) project (Cr. 2336-CHA), which like the proposed project covers a large number of counties, suggests that supervision would require about 85 staff-weeks over the life of the project, of which about 60 staff-weeks would be in the field. The Bank resident mission will provide initial review of procurement actions. More intensive supervision would be required during the first three years of the project, during which time project counties would gain experience with new means of beneficiary participation and national and international procurement. Supervision would be provided by financial analysts, water systems engineers, health and sanitation education specialists, and other specialists as needed. Assurances were obtained at negotiations that a mid-term review, to be undertaken no later than June 1, 2002, will review progress in meeting project objectives, as reflected by the monitoring indicators. The review will identify any changes needed to meet those project objectives, including but not limited to reallocation of funds and commitment of additional counterpart funds. Also, assurances were obtained at negotiations that the National Project Office (NPO) will (i) prepare, not later than six months after the Closing Date, or such later date to be agreed with the Bank, a plan for the future operation of the project; and (ii) afford the Bank a reasonable opportunity to exchange views on said plan.

#### Implementing Agencies:

The responsibility for project management and implementation is divided among national, provincial and county levels. At each level, Leading Groups will be established to provide policy guidance and advice of an intersectoral nature. Their responsibilities include: (a) formation and staffing of project offices; (b) oversight of project offices; (c) resolution of policy issues that arise during project implementation; and (d) coordination of project issues across project related government bureaus. The National Leading Group is headed by the Minister of Health. Provincial Leading Groups are headed by standing vice-governors responsible for health matters, with at least two bureau directors as members. County-level Leading Groups are headed by county magistrates and such bureau directors as the magistrate deems important to project execution.

Project offices will be established at each level to carry out day-to-day project implementation, and will be supported by sector institutions, design

institutes and international and national consultants. Their general responsibilities will include: (a) project design, guidance, coordination, supervision and evaluation at each administrative level; (b) management of water supply investments; (c) designing training programs and conducting national-, provincial- and county-level training in health education and project management; (d) organizing and delivering procurement of goods and civil works; (e) conducting mandatory reviews of water system designs; (f) preparing project progress and financial reports; (g) implementing project agreements and regulations; and (h) coordinating Bank mission visits and interaction between the Bank and domestic agencies supporting the implementation of the project.

County Project Offices (CPOs) have the critical responsibility of soliciting village interest in improved water supply, helping to design systems responsive to villager needs, supervising construction, and facilitating operation and maintenance of completed systems. Design and review of water schemes will be carried out by either the CPO, Provincial Project Office (PPO), or the NPO, depending on the size and complexity of the system. If a scheme serves only a single village, then responsibility for the operations of the scheme lies with the village government; if it serves multiple villages, then responsibility lies with the township government. Finally, if it should run across townships, then responsibility lies with the county government. CPOs, PPOs, and the NPO will all be responsible for supervision of water schemes. Design of training programs and conducting courses for water plant staff and local health and hygiene education workers will be the responsibility of CPOs. Training of CPO staff is the responsibility of the PPO, while that of PPO staff is the responsibility of the NPO.

As in previous rural water supply projects in China, procurement of materials and equipment will be handled through annual International Competitive Bidding (ICB) contracts, and procurement of civil works will be handled through numerous small and medium, and a few large civil works contracts (National Competitive Bidding and by invitation). In this project, the responsibility for ICB procurement will continue to rest with the NPO. As in the third (NRWS) project, the materials and equipment schedules for ICB will be based on preliminary designs for the sub-projects prepared for the following year, to ensure goods supplied match the operating conditions on site.

## 7. Sustainability

Local government funding and beneficiary financing through water tariffs provide a framework for project sustainability. The virtual absence of direct central government financing for the rural water supply and sanitation sector distinguishes China from most other developing countries. Water plants constructed under this project are maintained as independent systems, with tariffs set at a rate to cover the original investment and repay the loan. For most villagers, these tariffs are usually less than 3 percent of their annual gross per capita income. Benefiting villagers are expected to pay between 75 and 100 percent of the water supply capital costs. This payment is broken down as follows: a total of 25 percent of the costs are recovered from an upfront contribution consisting of cash and in-kind labor and materials contribution (typically totaling 10 to 15 percent of capital costs); another 50 percent of the capital costs are captured through tariffs; and a further repayment of up to an additional 25 percent may also be

incurred by villagers depending on the percentage of the local government contribution passed down through tariffs. In most instances in the first three projects, this arrangement has demonstrated high levels of sustainability. That would be enhanced under the current project through increased villager participation, better construction supervision and more intensive training of plant operators and managers.

Previous experience has shown that sanitation costs often exceed villagers' willingness to pay. This project will take steps toward ensuring replicability in this area by identifying higher-income households willing to invest in improved sanitation, and by using sanitation education to induce increases in willingness to pay. Health education financed by the project would be integrated with existing government-led programs, and would focus on sustainable behavioral change rather than on simply delivering messages to a target number of people.

On the institutional side, project training would provide the project offices with a foundation for efficient, cost-effective operation of the investment program. Efficient water supply system operation would benefit from training and institutional support in finance and water plant operation and management. Surveys to establish monitoring indicators and baseline conditions will provide valuable information, both for educators targeting health and sanitation messages and for measuring the benefits of this project.

#### 8. Lessons learned from past operations in the country/sector

Cost recovery: Earlier projects established that Chinese villagers, even in poor areas, would contribute capital and pay tariffs sufficient to finance safe and convenient water supply. Furthermore, despite abandoning collective farming, the village collective management structure remains sufficiently robust to manage water systems. The Bank's Operations Evaluation Department's evaluation of the first China rural water project financed by IDA confirmed that finding, as well as financial and health benefits from water supply investments. The second (RWSS) project was completed in December 1998. From this, we expect to obtain some quantification of the levels of cost recovery. Identified weaknesses in both projects include occasional excess optimism, hence system overdesign, and the need to improve quality through increased project office supervision of design and construction. Measures will be taken in this project to ensure that these weaknesses are corrected. The economic analysis for the NRWS project, as well as interviews with potential beneficiaries, showed that even the poorest villagers consider the health gains from clean water supply well worth the minimal upfront costs. Nearly all villagers are able and willing to pay for such investments. Despite some weaknesses in a limited number of sub-projects, overall, by international standards, water supply projects in China are extraordinary in their cost recovery and sustainability.

Need for greater focus on education rather than physical sanitation investments: Experience from earlier projects suggest the importance of focusing efforts on health and hygiene education, rather than physical sanitation investments, as a means of inducing behavioral change. This will be followed in this project.

Need for realistic expectations in terms of behavioral change:

Although basic health knowledge is fairly widespread, behavior in rural areas often does not match that knowledge. Experience from the previous projects suggests that even with higher quality education efforts, actual behavioral change can be a slow process. Slow progress in changing behavior does not invalidate health education efforts. A peer reviewer for the NRWS project pointed out that, "on a dollar-to-dollar basis, it costs less to achieve health benefits from sanitation and health education than from making water available." Previous projects in China as well as others worldwide have demonstrated the importance of careful targeting and very specific health messages, rather than general injunctions to behave well. This project will build on the experience acquired in the previous three projects in China, and continue to support the use of monitoring indicators and baseline surveys to help refine health messages and their delivery, thereby increasing the efficiency of these efforts.

Need for strong project management at the national, provincial, and local levels:

Previous experience has shown that the most successful Bank-financed projects in China have a strong commitment from the borrower as well as strong leading groups and strong Project Management Offices (PMOs) at the national, provincial, and local levels. The PMOs must be staffed with qualified, experienced, and competent staff in the key areas of engineering, procurement, accounting/finance, and sanitation and health education. This project will ensure that the same requirements for project management are kept at all levels. Development of the capacity of PMOs at all levels will be addressed through training workshop programs during project preparation and implementation.

Need for measures to safeguard against overdesign of water systems:

In the RWSS project, a limited number of water systems were overdesigned, with negative effects for cost recovery. This was because in the RWSS project, the criteria for system design were determined on an ad hoc basis. To correct for this problem, for the NRWS project, the design manual was updated and required to be followed. Also, increased emphasis was placed on rigorous review of designs to ensure that they are realistic with actual local consumption needs, and World Bank monitoring of the review process was increased. This project will follow those measures taken by the NRWS project.

Need for quality maintenance:

Another lesson gathered from the RWSS project was that of the necessity to provide training in operations and finance to local water plant staff in order to maintain the quality of each individual scheme. In the RWSS project, funding for such training was not included in the project and had to come out of local government budgets. As a result, training in some instances was inadequate, and the quality of the investment was not always successfully maintained. This was corrected in the NRWS project, with the inclusion of project funding for local training, and will continue in the current project as well.

9. Program of Targeted Intervention (PTI) This project is a targeted intervention program, as its beneficiaries are located primarily in poor rural areas. The main program objective categories for this project are environmentally sustainable development (50%) and poverty alleviation (50%).

10. Environment Aspects (including any public consultation)

Issues : No major environmental issues exist with this project. The balance of the environmental impact is substantially positive; however, potential adverse impacts from construction or a failure to protect water supply sources require the classification of the project as Category B in terms of the Operational Directive on Environmental Assessment. The project relies on a thorough review and supervision process to ensure that these environmental concerns are addressed. Measures for water source protection included in feasibility studies for water system designs and frequent water quality testing during implementation will ensure early identification of any problems.

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Note: This is information on an evolving project. Certain activities and/or components may not be included in the final project.

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## ANNEX

Because this is a Category B project, it may be required that the borrower prepare a separate EA report. If a separate EA report is required, once it is prepared and submitted to the Bank, in accordance with OP 4.01, Environmental Assessment, it will be filed as an annex to the Public Information Document (PID) .

If no separate EA report is required, the PID will not contain an EA annex; the findings and recommendations of the EA will be reflected in the body of the PID.