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FROM: Vice President and Secretary

August 24, 1999

IMPLEMENTATION COMPLETION REPORT

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT
(Credit No. 2336-CHA)

Attached is a report entitled "Implementation Completion Report: China: Rural Water Supply and Sanitation Project (Credit No. 2336-CHA)," dated June 29, 1999 (Report No. 19475) prepared by the East Asia and Pacific Regional Office.

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Report No. 19475

IMPLEMENTATION COMPLETION REPORT

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

June 29, 1999

Urban Development Sector Unit
China Country Management Unit
East Asia and Pacific Regional Office

CURRENCY EQUIVALENTS

(As of May 1991)

Currency: Renminbi
Currency Unit: Yuan (Y)
Y 1.00=100 fen
$1.00=Y 5.31

FISCAL YEAR

January 1 - December 31

WEIGHTS AND MEASURES

Meter (m) = 0.62 miles
Liter (l) = 0.264 US gallons
lpcd = liters per capita per day
Cubic meter or ton of water = 284 US gallons

ABBREVIATIONS AND ACRONYMS

CPO	=	County Project Office
ICB	=	International Competitive Bidding
O&M	=	Operations and Maintenance
MOF	=	Ministry of Finance
NPHCC	=	National Patriotic Health Campaign Committee
NPO	=	National Project Office
PPO	=	Provincial Project Office
RWSS	=	Rural Water Supply and Sanitation Project
UNDP	=	United Nations Development Program
UNDB/WB	=	UNDB/World Bank Water and Sanitation Program
WHO	=	World Health Organization

Gansu	=	Gansu Province
Guangxi	=	Guangxi Zhuang Autonomous Province
Hunan	=	Hunan Province
Inner Mongolia	=	Inner Mongolia Autonomous Region
Xinjiang	=	Xinjiang Uygur Autonomous Region
Yunnan	=	Yunnan Province

Vice President	:	Jean-Michel Severino, EAPVP
Country Director	:	Yukon Huang, EACCF
Sector Manager	:	Keshav Varma, EASUR
Task Manager	:	Dawn Vermilya, EACCF

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IMPLEMENTATION COMPLETION REPORT

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

PREFACE

This is the Implementation Completion Report (ICR) for the Rural Water Supply and Sanitation Project in China, for which Credit 2336-CHA in the amount of SDR 78.9 million (US$110.0 million equivalent) were approved on April 10, 1992 and made effective on July 23, 1992.

The credit was closed on December 31, 1998. The Credit was fully disbursed and the last disbursement took place on May 24, 1999, with the Special Account recovery.

The ICR was prepared by Ms. Dawn Vermilya (Task Manager and Financial Analyst—EACCF) and Lee Travers (Economist and former Task Manager—TWUWS), with contributions from George Plant (Water/Sanitation Engineer—EACCF), Dr. Huang Ping (Sociologist—Consultant), and Li Xiaofeng (Task Team Assistant) and reviewed by Messrs. Keshav Varma, Sector Manager, EASUR and Yukon Huang, Country Director, China. The Borrower provided comments that are included as an appendix to the ICR.

Preparation of this ICR was begun during IDA's final supervision/completion mission, from November 23 to December 4, 1998. It is based on material in the project file. The borrower contributed to preparation of the ICR by the National Project Office contributing summary data, views reflected in the mission's aide-memoire, and their own evaluation of the project's execution.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

EVALUATION SUMMARY

Introduction

1. The Rural Water Supply and Sanitation Project was designed to supply about 9 million rural inhabitants in 75 counties in the provinces and autonomous regions of Guangxi, Yunnan, Hunan, Gansu, Inner Mongolia and Xinjiang with safe drinking water, health/hygiene education, and access to improved sanitation technologies. The project supplemented the national rural water supply program's efforts to meet their 1995 target to supply 85 percent of the rural population with improved water supply, including 30 to 40 percent served by piped systems and 35 to 50 percent meeting water quality standards. As of 1997, 89 percent of China's rural population had access to improved water supply, of which 48 percent was being served by piped water and almost all piped water systems meet the government's standards for safe water quality. This project is the second in a series of four rural water supply and sanitation projects that have been negotiated with China, which address raising the quality of rural drinking water to meet national standards and improving the health and hygiene conditions in rural China.

Project Objectives

2. The overall project objective was to improve the health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training. Supporting project objectives were to: (a) develop sectoral strategies to prioritize investments at the county level, (b) use community participation to maximize project impact, (c) maintain properly staffed institutions to support adoption, implementation and operation of investment programs, (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction, provision of equipment and utility vehicles, technical assistance and training; and, (e) establish ongoing and expanding programs and enhance community participation and replicability through provision of appropriate models, development and distribution of standards and manuals.

3. The project components in brief were:

- **Water Supply.** Construction of facilities such as waterworks systems, communal faucet systems, wells with hand pumps, and rainwater collectors to provide safe and sufficient drinking water to some 9 million rural inhabitants;

- **Sanitation**. Construction of facilities such as household, communal and school latrines, animal enclosures and drainage ditches in selected demonstration and pilot villages in each project county;

- **Health/Hygiene Education.** Provision of health/hygiene education to all project counties through training of provincial, county and community administrators, healthcare workers, teachers, and community women and through them the general population; construction of training facilities; dissemination of training and health/hygiene education materials;

- **Technical Assistance and Training.** In conjunction with the ongoing United Nations Development Program (UNDP) project, provision of technical assistance and training in management, finance, procurement, training of trainers, and technical aspects of the first three project components at the national, provincial, prefecture, county and community levels; and

- **Institution Establishment and Project Management.** Construction of project offices and dormitories; provision of office equipment; and financing of project management and supervision activities.

4. There were three legal covenants that, in particular, supported achieving the substance of the objectives and components:

- Satisfactory publication and distribution of design manuals for low-cost rural water supply technologies and rural sanitation facilities was a condition of credit disbursement for civil works;

- Planning and design of subprojects would be done in accordance with the criteria contained in the planning and design manuals and the criteria and procedures for review and approval of subprojects would be followed; and

- Each Project Province and Region shall cause charges for water provided by each piped and nonpiped water systems financed from the proceeds of the Credit to cover: (a) the costs of operating and maintaining such system and a pro-rata portion, determined in a manner acceptable to the Association, of the costs associated with the repayment by the Project Province or Region of the proceeds of the Credit made available to the Province or Region (excluding any grants from the Project Province, Region or Counties to the beneficiaries of water systems), during the period repayments of the Credit proceeds are being made by the Province or Region; and (b) thereafter, the costs of operating and maintaining such system including provision for depreciation on a basis acceptable to the Association.

5. The stated overall objective of the project was assumed to lead directly from the project components, but was not itself monitored. Among the objectives, the clear priority of the Borrower and the project task teams was to "increase coverage in water supply,

sanitation and health/hygiene education." The specific objectives mentioned above were appropriate at the time of appraisal except, in the sanitation improvement objective, that for "enhancing ... replicability through provision of appropriate models." There, even a preliminary economic analysis would have shown that the model villages and the sanitary latrine models being considered were so costly compared to traditional practices that they exceeded willingness to pay of almost all the targeted poor communities receiving improved water supplies.

Implementation Experience and Results

6. **The project *substantially* achieved its major objectives.** The project brought sustainable, improved water supplies to over 9 million poor people. Extensive borrower and IDA supervision consistently revealed highly positive beneficiary villager self-assessment of project results. Depending on the original water problem, reduction in incidence of intestinal diseases reported, particularly among children, and time reduction to fetch water daily have been the main ways in which the project has benefited the project villagers.

7. The physical completion of water facilities and the connection of beneficiaries has been *substantial*. At project close, over 2,000 water supply systems and 70,000 hand pumps and cisterns were operating. In total these systems are currently serving 8.9 million beneficiaries (99 percent of target). The target of 9.06 million beneficiaries is expected to be exceeded when the final 125 water plants, under construction at project close, become operational. In most water supply systems, the water tariff is covering operation and maintenance costs and is either fully or substantially covering agreed debt service set-aside payments. Community participation, although in most respects modest during the feasibility and design stages, has had a strong impact on project results. The health education achievements have been *substantial*. The sanitation achievements of the project have been *partial*. The improved sanitary latrine construction program failed to generate the expected demand from the target population, even with some government subsidy. This problem arose because of affordability concerns and because the linkage between improved sanitation and better health is not strong enough to overcome traditional preferences for fresh nightsoil use for part of crop fertilization. Although demonstration villages in themselves were successful in improving the quality of their environment and educating the village population on health education and sanitation issues, they have not been as successful as planned in producing an obvious demonstration effect in neighboring nonproject villages and counties.

8. The project was affected by a substantial devaluation in 1994 and by the government ending its import duty exemption on World Bank Group-procured goods, which raised the local currency cost of imports. In addition, in the early 1990s, China experienced inflation that substantially increased local currency project costs. However, devaluation increased the local currency value of the IDA Credit sufficiently to offset inflation during the project period, so the Credit remained sufficient for original project goals. Inflation nonetheless partially affected project completion, since local governments

had budgeted their local currency contribution in a fixed nominal amount and some of the provinces resisted making the needed counterpart fund adjustments. The cumulative result of the various financial and management problems was a 12-month delay in completing project activities.

9. Project sustainability is rated as *likely*. Financially, systems are covering operations and maintenance costs and are making a full or significant contribution to debt service repayment through the water tariff. Technically, the equipment and materials are almost all domestically produced and widely available. The mechanical operating skills are available, even in poor counties. Moreover, beneficiaries recognize the time savings and health benefits of safe water, hence have a strong impetus to keep the water systems operating smoothly and finance repairs and expansions. Health and hygiene education programs are ongoing, and the project's contribution was to supplement the existing much larger program, so its sustainability is considered *likely*. IDA performance has overall been *satisfactory* from project identification to completion. Borrower performance was *highly satisfactory* during preparation and has overall been *satisfactory* during implementation and project completion.

Summary of Findings, Future Operations, and Key Lessons Learned

10. Overall, the project is assessed to have achieved a *satisfactory* outcome. *Highly satisfactory* aspects of the project, for which all objectives were met, were the physical completion of water systems, and connection of almost 9.0 million beneficiaries, reported high levels of beneficiary satisfaction, and high levels of cost recovery. The physical implementation of the health and hygiene education program was *highly satisfactory* per the objectives set at appraisal, but since it is not clear that the health messages have resulted in significant behavior changes, the overall rating for this component is *satisfactory*. The sanitation program and demonstration village program are considered to be *satisfactory* as far as physical implementation, but because demand was not generated for the improved latrines program, and the model villages program lacked significant demonstration effect, the overall rating for this component is *unsatisfactory*.

11. Because the Government in China is reorganizing and plans to significantly reduce its staff, a final decision on institutional arrangements to oversee the water systems has not been decided. Currently, the three options under consideration are: (a) maintaining the County Project Offices (CPOs) but expanding their responsibilities to cover all government-sponsored rural water supply projects in the counties; (b) converting the CPOs into Rural Water Supply Companies, which would still allow government budgetary financing for a limited period of time before they would have to fully finance themselves; or (c) allowing the townships to take responsibility for providing services to the village water schemes, since most townships have a water company responsible for town supply, which could provide the technical expertise required. Health intervention initiatives will occur through existing service providers: doctors, women's committees, and through school programs.

12. There are five key lessons from this project. First, long-term loans to poor villages can complement village resources to sustainably and significantly improve water supply. Second, demand for improved latrines is correlated with higher income levels, and, in contrast to improved water supply, the income levels of the rural poor in this project were too low to support the latrine improvement strategy. Third, investing in model villages is not a successful strategy for yielding demonstration effects when the external government financing needed to construct the model is not available to other villages seeking to replicate the model. Fourth, training of water plant managers, operators and accountants is critical to the sustainability of the water plant subprojects and proceeds of the Credit should be made available to ensure that adequate training is taking place. Fifth, intensified traditional approaches to health education have reached a saturation point. In order to increase the acceptance of health messages and behavior modification, the inhibitors for improved practice must be identified, and the health education program modified accordingly.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

PART I: PROJECT IMPLEMENTATION ASSESSMENT

A. PROJECT OBJECTIVES AND DESCRIPTION

1. **Objectives.** As stated in the project Staff Appraisal Report, the overall objective was to improve health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/ hygiene education, technical assistance and training. Through project preparation and implementation, immediate objectives set for the project were to: (a) develop long-term sectoral and subsectoral strategies to prioritize investments at the county level; (b) explore and develop appropriate low-cost alternatives as well as formulate affordable and sustainable programs for water supply, water treatment and sanitation through community participation to maximize project impact; (c) establish and maintain properly staffed institutions as well as provide technical assistance and training to support adoption, implementation and operation of investment programs; (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction, provision of equipment and utility vehicles, technical assistance and training; and, (e) establish ongoing and expanding programs and enhance community participation and replicability through provision of appropriate models, development and distribution of standards and manuals, as well as dissemination of experience and lessons learned.

2. **Components.** The project components were:

- **Water Supply:** construction of facilities such as waterworks systems, communal faucet systems, wells with hand pumps, developed springs, rainwater collectors and related facilities to provide safe and sufficient drinking water to some 9 million rural inhabitants; provision of water quality testing equipment and utility vehicles; continuation of development, introduction and dissemination of new technologies through demonstration, publication and distribution of manuals and guidelines;

- **Sanitation:** construction of facilities such as household, communal and school latrines, animal enclosures and drainage ditches in selected demonstration and pilot villages in each project county; provision of the foundation for replicable programs by developing and demonstrating all aspects of the program that delivers not just latrines but facilities that are demanded, effectively used and sustained for the duration of their service life;

- **Health/Hygiene Education:** provision of health/hygiene education to all project counties through training of provincial, county and community administrators, trainers, healthcare workers, teachers, community women and through them the general population; construction of training facilities; development and dissemination of training and health/hygiene education materials; provision of materials, supplies, equipment and utility vehicles;

- **Technical Assistance and Training:** in conjunction with the ongoing United Nations Development Program (UNDP) project, provision of technical assistance and training in management, finance, procurement, training of trainers, and technical aspects of the first three project components at national, provincial, prefecture, county and community levels; and

- **Institution Establishment and Project Management:** construction of project offices and dormitories; provision of office equipment; and financing of project management and supervision activities.

3. **Covenants.** There were three legal covenants that particularly focused on achieving the substance of the objectives and components:

- Satisfactory publication and distribution of design manuals for low-cost rural water supply technologies and rural sanitation facilities would be a condition of credit disbursement for civil works;

- Planning and design of subprojects would be done in accordance with the criteria contained in the planning and design manuals and the criteria and procedures for review and approval of subprojects would be followed; and

- Each Project Province and Region shall cause charges for water provided by each piped and nonpiped water systems financed from the proceeds of the Credit to cover: (a) the costs of operating and maintaining such system and a pro-rata portion, determined in a manner acceptable to the Association, of the costs associated with the repayment by the Project Province or Region of the proceeds of the Credit made available to the Province or Region (excluding any grants from the Project Province, Region or Counties to the beneficiaries of water systems), during the period repayments of the Credit proceeds are being made by the Province or Region; and (b) thereafter, the costs of operating and maintaining such system including provision for depreciation on a basis acceptable to the Association.

4. **Assessment of Objectives.** The stated overall objective of the project was assumed to lead directly from the project components, but was not itself monitored. Among the objectives, the clear priority of the Borrower and the project task teams was to "increase coverage in water supply, sanitation and health/hygiene education." The specific objectives mentioned above were appropriate at the time of appraisal except, in the sanitation improvement objective, that for "enhancing ... replicability through

provision of appropriate models." There, even a preliminary economic analysis would have shown that the model villages and the sanitary latrine models being considered were so costly compared to traditional solutions that they exceeded willingness to pay of almost all the target poor communities receiving improved water supplies.

B. Achievement of Project Objectives

5. **The project substantially achieved its major objectives.** The project brought sustainable, improved water supplies to over 9 million poor people. Although lacking a monitoring program to measure health and productivity gains, extensive borrower and IDA supervision consistently revealed highly positive beneficiary villager self-assessment of project results. The National Project Office (NPO) conducted a few more formal baseline and follow-up surveys that support this finding (although the survey methodologies have weaknesses). Depending on the original water problem, reduction in incidence of intestinal diseases reported, particularly among children, and time reduction to fetch water daily have been the main ways in which the project has benefited the project villagers. Supervision teams have verified financial sustainability through direct inspection of water plant accounts.

6. **Water Supply.** The physical completion of water facilities and the connection of beneficiaries has been *substantial*. At project close, 2,193 water supply piped networks were operating and an additional 125 water plants were under construction (87 percent of plan), 7,296 hand pump schemes (93 percent of plan), and 63,998 rain catchment systems (116 percent of plan) have been completed. In total these systems are currently serving 8.9 million beneficiaries (99 percent of target; target is expected to be exceeded when the final 125 water plants become operational), and if design population targets are achieved, could supply as many as 12 million beneficiaries during the next 10 to 15 years.

7. Design and construction quality has generally been good, but supervision has revealed weaknesses in a number of systems. On the water plant design side, problems that have been reported in aide-memoires generally fall into the following categories: (a) some system designs may not represent least-cost engineering options, but while unnecessarily increasing costs, in the known cases this has not threatened service affordability and willingness-to-pay; and (b) overoptimistic billable water consumption design parameters have resulted in actual operating levels significantly below design capacities, again increasing unit service costs. Among construction problems, certain "outlier" engineering deficiencies may shorten the service life of individual water plants, or compromise water quality unless rectified, e.g., improperly installed main meters, well heads not sealed or surface water sources not sufficiently protected, poor ventilation and drainage at installations, or improperly installed household meters.

8. Quality water plant management was not a separate objective of the project nor was project financing included for training of water plant managers, engineers and accountants. System operation and maintenance (O&M) has generally been satisfactory, but has also been quite varied. Since weak management performance threatens water

plant sustainability, during project implementation the need to support training for quality management at some water plants became clear. As a result, IDA agreed to allow funds in the technical assistance category to be used for the training of water plant staff.

9. Financial recordkeeping for the water plants has also been variable, but generally it has been satisfactory. Where financial recordkeeping was noted to be poor, accounting staff turnover or lack of training were the causes. As a partial response, financial training was included in the topics suitable for technical assistance funds.

10. **Cost Recovery.** Financial cost recovery in water schemes has been *substantial* and has reached levels unprecedented in other Bank Group-funded rural water supply projects. Of the total investment, beneficiaries have contributed, on average, 30 percent of the investment in upfront cash, materials and labor. In addition, 60 percent of water plants are covering water plant operating costs and the agreed set-aside for debt service repayment through the water tariffs paid by the beneficiaries. Of the remaining 40 percent of water plants, most are covering O&M and a significant portion of the debt service. Almost all piped water systems have met or exceeded the cost recovery covenant.

11. **Community Participation.** Community participation, although in most respects modest during the feasibility and design stages, has had a strong impact on project results. Specifically, villager preference for piped network systems supplying water to yard or house taps forced designers to shift from mostly hand pump systems to piped network systems. Likewise low beneficiary demand for improved sanitary latrines, largely based on their own and hence more realistic assessment of their economic and education level, led to a 50 percent reduction in that construction target. Throughout the project, beneficiaries participated significantly through the provision of cash and in-kind contributions of labor and materials. Original estimates suggested that beneficiaries would pay about 20 percent of the project investment costs in upfront cash and in-kind contributions, and assume, on average, 88 percent of the Credit repayment responsibilities. Together, the beneficiaries were to be responsible for about 71 percent of the investment costs, the remainder to be provided through government counterpart funding at various levels. As of the latest actuals in June 1998, beneficiaries through upfront contributions and assuming the burden of most of the debt repayment through the water tariff, are covering about 74 percent of investment costs.

12. **Health/Hygiene Education.** Health education programs for health educators, women's committees and village leaders, and the dissemination of health educational materials has been widespread and has supported the government's existing health education programs. The NPO reports that some 9.4 million rural women, children and men have received health education under the project. The beneficiaries received health education by attending training classes at the village level, reading health/hygiene educational materials (including posters, pamphlets, videos, etc.), or participating in other health education activities (including public meetings and performances).

13. A Yunnan province report, based on sampling interviews and direct observation, shows significant behavioral changes when compared with baseline survey data. Latrine use has risen for housewives from 92 to 95 percent, and for school-age children from 44 to 86 percent. The incidence of washing hands before eating has risen for housewives from 3 to 83 percent, and for school children from 56 to 98 percent. Drinking boiled water among housewives has risen from 16 to 75 percent, and among school children from 25 to 93 percent. As the survey report states, there may be many other factors such as socioeconomic development that have played roles in these behavior changes, but nonetheless the project itself did help beneficiaries to improve their hygiene behavior and sanitation environment. However, independent observations during routine supervision missions suggests that beneficiaries are not consistently practicing good hygiene, such as boiling drinking water, and washing hands before eating and after using the toilet, even though they knew they should be doing so.

14. A later survey conducted by the Bank Group found that although the behavior messages were being understood by most beneficiaries, the messages were not conveying why poor hygiene led to disease (e.g., germ transmission, disease vectors, etc.). Hence, the messages need to be studied and revised if a significant improvement in behavior modification is to occur.

15. **Sanitation.** The sanitation achievements of the project have been *partial*. Per the original proposal and in terms of the number of household latrines, the improved sanitary latrine construction failed to generate significant demand from the target population, even with some government subsidy. This because of affordability concerns—even the least costly sanitary latrine models can cost half of a poor family's annual income—and the linkage between improved sanitation and better health is not strong enough to overcome traditional preferences for fresh nightsoil use for crop fertilization. At the mid-term review, latrine construction targets were halved. At project close, household latrine construction was 120 percent of the revised plan. School and public latrines also exceeded their revised targets, by 107 percent and 114 percent, respectively.

16. Although demonstration villages in themselves were successful in improving the quality of the environment and educating the village population on health education and sanitation issues, they have not been as successful as planned in producing a demonstration effect in neighboring nonproject villages and counties. There are two reasons for this: (a) government subsidies were used to construct most of the latrine and supporting facilities in the demonstration villages, but similar government financing could not be provided to nondemonstration villages; and (b) the cost of demonstration facilities constructed was high compared to villagers' annual disposable income and no means of providing long-term financing for these assets to nondemonstration villages was devised during the project implementation. Some 84 demonstration villages out of an original target of 112 were completed under the project.

17. **Technical Assistance and Training.** Training of project office staff at all levels—national, provincial and county—was *substantially* achieved and led to

satisfactory implementation of the project by most County Project Offices (CPOs). After the project's mid-term review, Credit proceeds were made available to train water plant staff, thus helping to improve the sustainability of the water systems. As of project close, only 46 percent of the Credit's Consulting Services and Training category had been disbursed, although this does not reflect the level of effort, but rather the use of domestic, hence much cheaper, consultants and trainers than the international consultants anticipated at appraisal. The remaining $331,000 from the category was transferred to the civil works expenditure category per the Government of China's request just before project close. During supervision missions it was noted that where training of project office staff was carried out to a high level and where staff turnover was low or where replacement employees were properly trained, the project progressed smoothly. It was also noted that the quality of water facility financial and operational management was directly correlated with the training received by the operators.

18. **Project Management.** Management responsibilities are shared among central government, project province, project county, and water plant levels. The county and water plants play the key implementation role, with central and provincial governments active in some procurement and overseeing county work. The latter were marginally satisfactory, with administrative financing constraints that held field supervision below desired intensity, but was fully satisfactory when undertaken. Routine reporting requirements were satisfactorily met. At the county and water plant level, the large number of diverse players led to varied performance. Overall, performance objectives were *substantially* achieved, with both auditors and IDA supervision identifying a small number of performance failures that were, in all instances, remedied.

19. **Procurement.** Procurement under the project overall was satisfactory and almost all transactions fully satisfied World Bank Group guidelines. There were more than 2,000 civil works contracts and three international competitive bidding (ICB) contracts carried out under the project. During supervision missions the procurement documentation was reviewed by the IDA team at each CPO. In a few cases where World Bank Group guidelines were not fully complied with, the problems encountered were that the Borrower had used marking or bracketing, which is in agreement with the central government's procurement regulations. In all cases reviewed during supervision, the lowest evaluated responsive bidders were selected, and the result was the same as would have occurred if the Borrower fully complied with Bank Group guidelines. In these cases the mission leader stated in the aide-memoires that the practice of marking and bracketing was not allowed and should not be continued. The ICB procurement was carried out in compliance with Bank Group guidelines, but the bidding documents had to be revised several times in order to meet Bank Group guidelines, and hence there were delays in the ICB procurement process.

20. **Economic Reevaluation**. As stated in the Staff Appraisal Report, "The overall project objective is to improve the health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training." Both the borrower

and task team were persuaded that the inputs—improved water supply, sanitation services, and health/hygiene education—would necessarily lead to health and productivity improvements. In support of this, they reported two studies of previous water, sanitation or health education projects in a range of countries that showed positive health outcomes. The Staff Appraisal Report provided no details, or even citations, of those studies, but one seems clearly to be the well-known 1991 paper by Esrey, et al. ("Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma," *WHO Bulletin 69* (5) (1991): 609-621). The borrower, and IDA team, reasoned that improved health would lead to improved productivity.

21. Neither the borrower nor the appraisal team undertook further benefit analysis. Nor did they put into place a monitoring program that would allow ex-post evaluation of the program assumptions. However, the Esrey paper shows a substantial range of reductions in disease incidence from the various programs analyzed, while making the point that few of the studies would themselves pass a strong methodological test. In the worst cases, the Esrey paper reports investments showing little or no impact on disease incidence. And, of course, disease incidence does not have a one-to-one relationship with productivity. In their defense, the appraisal team explicitly recognized that serious evaluation efforts on health impacts are difficult to do well, probably contributing to their decision not to invest resources in this area. With this history, the ICR team cannot reanalyze the expected benefits.

22. With the expectation of substantial health benefits (Staff Appraisal Report, para. 5.5), the team concentrated its preparation and appraisal attention on two other elements of project design—beneficiaries and cost-effective inputs.

23. A major departure of this second rural water project from the first (China: Rural Water Supply Project, Cr. 1578) can be found in the targeted beneficiaries. The first project invested primarily in larger water systems, often serving towns rather than villages. It also included several wealthier provinces, including Beijing Municipality. While successfully implemented, beneficiaries tended to be among the better-off rural residents. The government and Bank Group agreed that the second project would focus on poorer rural areas and, within them, on poorer people.

24. During project preparation, the teams devoted considerable effort to developing an effective targeting mechanism to reach their objective of serving "the poorest and most needy inhabitants of rural China." First, the project was limited to six poorer provinces. Then the targeting mechanism used four indicators: income, water-related health, water shortages, and minority prevalence, to identify potential beneficiary counties. Finally, it eliminated county towns as potential beneficiaries, then specified preferred technologies more suited to lower service levels, hence lower-income communities. Within those communities, water supply solutions would be designed to benefit all residents. This approach took advantage of the relative homogeneity of Chinese villages, a consequence of strictly limited migration and the communal system prevailing for so many years. The

counties chosen for project participation had 1989 (the most recent year statistics were available) average per capita incomes ranging from $30 to $150.

25. The targeting effort was successful. That success cannot be understated, given that the project design targets the poor while expecting a 20 percent initial capital contribution (in some combination of cash, materials and labor) from villagers and passing on the full loan and O&M obligation to the benefiting village. This financial test forces a much more careful assessment of sustainability than the traditional practice of full capital subsidies. Despite the fact that the very poorest villages could not be included due to their inability to generate sufficient cash, the borrower did an excellent job of identifying poor villages whose need was for long-term financing rather than welfare handouts. Supervision teams visited a large number of beneficiary villages and found very few where household assets or other wealth indicators suggested mistargeting.

26. The project design for cost-effective inputs complemented the beneficiary targeting work. The borrower utilized extensive domestic and international expertise in preparing design manuals that would help bring effective nonpiped, small system and sanitation solutions to rural areas. These manuals are an important resource for engineers trained in standard municipal designs and were completed and disseminated to meet design needs, as well as a disbursement condition. Bank Group supervision teams have found the manuals in broad use several years after project inception and systems based on them to effectively meet village needs.

27. The project design anticipated minimal numbers of household water connections, instead favoring standpipes and other group facilities. This was driven by the desire to maximize the number of beneficiary villages. However, in practice many residents of villages receiving piped water have demonstrated a strong preference for household connections. This demand has been met without reducing project scope, as households wanting that service have simply been asked to pay the extra cost of the connection. Since a household connection reduces water-gathering time, increased use typically results, as does increased villager commitment to proper system functioning.

28. Just as unanticipated household demand led to more frequent system connections than anticipated, a lack of household demand led to lower sanitation coverage. The sanitation component sought "to promote demand for improved sanitation" by bringing a few improved latrines to all villages, and comprehensively upgrading selected villages in several aspects, including drainage, latrines, and livestock compounds. The villages would thereby become models for their neighbors.

29. The project successfully introduced latrines and upgraded villages, but by the mid-term review it was clear that the learning effect was small. Latrine use was already extensive in project villages, due to a long history of collecting feces for use as fertilizer. The sanitation component introduced latrine designs with longer retention periods and composting features, both designed to lower pathogen counts before use of feces on fields. As mentioned above, design manuals were also prepared for this component.

Unfortunately, the design characteristics of composting latrines left most villagers unable to build the latrines themselves, and the latrines required manufactured components that drove up costs. Since traditional latrines required only labor and locally gathered materials, most villagers found the new latrines an unattractive alternative if not accompanied by a substantial subsidy. The same was true of the other measures designed for model villages. Because government lacked the money to subsidize more than the pilot programs, neighboring villagers or villages could not replicate the upgraded facilities provided by the program.

30. The latrine/model village program scope was substantially reduced at the mid-term review. Although Chinese domestic programs have successfully introduced similar changes in wealthier villages, the borrower concluded, and the Bank Group agreed, that poor villages served by this Credit simply lacked the means to substantially upgrade sanitary facilities at their own expense. Emphasis was therefore placed on health education inputs to which villagers could respond without major cash expenditures. This project provided a valuable test of compost latrines in poor areas, but the lesson was that China cannot expect broad uptake in poor areas.

31. The water supply services are community-owned and operated, with the goal of cost recovery but not profit. For this reason, the appraisal team did not estimate a project financial rate of return and no re-estimation could take place. The other components had no ongoing revenue flows.

C. Implementation Record and Major Factors Affecting the Project

32. Factors not generally subject to government control had little influence on the achievement of project objectives, so this discussion will focus on factors under government or implementing agency control.

33. During the project period, the Chinese government ended its earlier practice of maintaining an overvalued local currency, resulting in substantial devaluation in 1994. One year later the government also ended its import duty exemption on World Bank Group project-procured goods. These actions raised the local currency cost of imports. The first of them reduced import competitiveness and the second import desirability (tariffs were not factored into bid evaluations, but certainly were by borrowers into total costs). However, all major equipment and materials are produced in China to acceptable quality levels and although the import composition of the project fell, project components continued to meet quality and cost goals.

34. Government macroeconomic policies in the early 1990s fostered inflation that substantially increased local currency project costs. However, devaluation increased the local currency value of the IDA Credit sufficiently to offset inflation during the project period, so the Credit remained sufficient for original project goals. Inflation nonetheless partially affected project completion, since local governments had budgeted their local currency contribution in a fixed nominal amount and some of the provinces resisted

making the needed counterpart fund adjustments. The adjustments were eventually made, but played a large role in the delayed project completion.

35. The NPO funding shortfall is discussed under Borrower Performance. This affected their supervisory effort and, through that, partially reduced both their effectiveness and overall project quality. The NPO also had some difficulty writing procurement specifications to adequate quality and leading the subsequent evaluation and contracting effort, leading to delays in ICB goods procurement. This, too, partially affected timely project construction, contributing to the delayed completion.

36. The cumulative result of the various financial and management problems was a 12-month delay in completing project activities, with an overall disbursement period of 89 months compared to the 72 months foreseen at appraisal.

37. **Implementation Timing.** The project's implementation period was officially extended by one year to December 31, 1998 after the project mid-term review to allow sufficient time to complete construction of water facilities, connection of target beneficiaries and training of water plant staff. Delays in counterpart funding commitments and in preparation of satisfactory ICB bidding documents were the main reasons the project needed to be extended to meet the targets.

38. **Project Costs.** The project experienced significant cost increases in Renminbi terms, but is expected to meet appraisal estimates in US dollar terms. At appraisal, the project was expected to cost Y 1,094.6 million or $189.1 million equivalent. As of June 30, 1998, the project investment totaled Y 1,377.7 million or 126 percent of the original estimate. Project financing expectations at appraisal were divided as follows: IDA, 58 percent; various government levels, 22 percent; and communities and individuals, 20 percent. Project financing in Renminbi terms as of June 30, 1998 was: IDA, 51 percent; various government levels, 19 percent; and beneficiaries, 30 percent. Beneficiaries in all provinces and regions have exceeded their planned contributions by an average of 124 percent. The variance in project costs and project financing resulted from two changes: (a) significant domestic inflation—contingencies were originally estimated as 41 percent of the base cost in Renminbi terms, but in actuality, contingencies to base costs were 78 percent; and (b) subproject redesign from mostly hand pump systems to mostly piped water systems—this in response to beneficiary demand. The debt service burden on projects constructed after 1994 is much larger in Renminbi terms than originally anticipated because of a 56 percent devaluation in the Renminbi/US dollar exchange rate that occurred in 1994. Increases in average per capita income during the project appraisal and implementation period were on the order of 17 percent per year. The significantly increased incomes make it likely that debt repayment will not be a significant problem.

D. Project Sustainability

39. Project sustainability is rated as *likely*. Financially, systems are covering O&M costs and are making a full or significant contribution to debt service repayment through

the water tariff. This provides the financial resources needed for sustainable operation. Technically, the equipment and materials are almost all domestically produced and widely available. The mechanical operating skills are available even in poor counties, where hand tractors and other machinery of a technical level comparable to the water plants are in common use. To bolster those inputs, county governments plan to continue, in a modified form, the function of the county project office, to provide technical support for the project's assets as well as the Government's broader rural water supply program. Moreover, beneficiaries recognize the time savings and health benefits of safe water, hence have a strong impetus to keep the water systems operating smoothly and finance repairs and expansions. Health and hygiene education programs are ongoing, and the project's contribution was to supplement the existing much larger program, so its sustainability is considered *likely*. The two subsequent Bank Group-financed rural water supply and sanitation projects have recognized the successful elements of this project, while being modified to reflect lessons learned.

E. IDA Performance

40. IDA's performance in project identification, preparation and appraisal was satisfactory. This project developed from the Rural Water Supply Project (Cr. 1578), but represented a substantial evolution in terms of poverty targeting and in the inclusion of sanitation and health education. Identification and preparation of this project drew directly on results from a UNDP/World Bank Water and Sanitation Program project undertaken in Xinjiang and Inner Mongolia, both included in this project, and on a 1990 European Economic Community-funded rural water sector study and training program. Simultaneously with preparation of this project, Bank Group staff worked with UNDP staff in preparing a supporting UNDP project to strengthen management in beneficiary counties, provinces and the national project office. The IDA preparation team played an effective role in facilitating these substantial external partner efforts. That team contained a strong mix of water and sanitation engineers familiar with the technical and management requirements of providing the needed services, health education specialists, and a financial analyst and economist. They effectively conveyed international experience in similar conditions and helped translate that experience into actual design practice in China. Appraisal was carried out with a full team of specialists, ranging over water supply, sanitation, and health education. The economic analysis was the one area of appraisal weakness, because it made no apparent effort to establish willingness-to-pay for the improved sanitation. Even a simple effort would have shown that villagers lacked the ability to replicate the highly subsidized model latrines introduced by the project.

41. IDA teams also demonstrated satisfactory performance in project supervision. The 75 project counties and thousands of beneficiary villages presented a particular supervision challenge. But the 13 supervision missions over the project life visited a broad selection of project counties and villages, utilized county-level audit reports as an important complement to direct visits, and worked consistently to strengthen the provincial and national project office supervision efforts. Initially, rapid task manager turnover, with three task managers in the first three years of project life, may have

weakened supervision efforts, although continuity was not wholly broken, as the second task manager had been on the appraisal team and the third a member of the second task manager's supervision team. Staff rotation forced yet another task manager change late in the project life, although again the new task manager had been a key member of earlier supervision teams. These changes did not impede effective Bank Group advice and Bank Group supervision was key in helping the borrower identify why the sanitation demonstration program was not progressing as expected, and, through the mid-term review, rebalancing the project to adjust for that.

42. Bank Group decentralization had an important, positive impact on supervision in the latter stages, as a field-based engineer and a financial analyst combined with a locally hired consultant sociologist to provide a strong supervision team located in the same city as the national project office. This considerably increased the frequency of contact with that and other project offices and brought welcome flexibility to project site visits. With that change, the traditional Bank Group technique of counting mission numbers lost relevance.

F. Borrower Performance

43. Borrower preparation performance was highly satisfactory. The borrower identified appropriate beneficiary counties and played a large role in developing sustainable village-level project financing mechanisms. The project design was based on high levels of beneficiary financial commitment, hence project ownership. All project counties prepared feasibility studies and preliminary project designs appropriate to their conditions. The NPO took the lead in developing, with international consultants, the needed design manuals.

44. Borrower implementation performance was much more mixed. The NPO was expected to play a major supervisory role but their administrative financing arrangements, developed during project preparation, were not honored during implementation. With inadequate resources, the NPO could not act with the independence and efficiency envisioned at appraisal. Instead, they focused on ICB procurement, engineering review and approval, training, meeting Bank Group reporting deadlines, and accompanying Bank Group teams to the field. NPO staff quality was good, although their numbers were inadequate. Reporting deadlines were met, and reports were of good quality, but NPO procurement delays were common. In a larger sense, sector and financial policies remained generally positive.

45. Relative to their task, the six provincial project offices (PPOs) were generally better financed and more active than the NPO. But they, too, provided less aggressive field supervision than the Bank Group desired. In similar, but domestically funded, development projects the provincial level typically becomes less active after appraisal, focusing on reviewing progress reports and authorizing financial transfers. Counterpart funding generally lagged project needs at the height of the project investment cycle and contributed to implementation delays. Overall, in spite of having well-qualified

individuals in the provincial project offices, some provinces performed to satisfactory levels while others fell short of fully satisfactory performance.

46. With 75 counties and thousands of villages, this level is difficult to generalize about. This level also faced the greatest challenges, as they were least familiar with Bank Group requirements, but they build and run the systems. The counties deliver training and oversee design, procurement and construction. The villages contribute to building and then run their systems. Village beneficiaries demonstrate very high levels of water system ownership. The project succeeded in reaching coverage targets while instituting sustainable financing and operations management. On the whole, then, this group has satisfactory performance. In many locations, "highly satisfactory" would be a fairer assessment, but several instances of deficient performance have also been found.

47. Covenant performance was good. Government auditors performed well in most counties, providing additional implementation guidance.

G. Assessment of Outcome

48. Overall, the project is assessed to have achieved a *satisfactory* outcome. *Highly satisfactory* aspects of the project, for which all objectives were met, were the physical completion of water systems, and connection of almost 9 million beneficiaries, reported high levels of beneficiary satisfaction, and high levels of cost recovery. The physical implementation of the health and hygiene education program was *highly satisfactory* per the objectives set at appraisal, but since it is not clear that the health messages have resulted in significant behavior changes, the overall rating for this component is *satisfactory*. The sanitation program and demonstration village program are considered to be *satisfactory* as far as physical implementation, but because demand was not generated for the improved latrines program, and the model villages program lacked significant demonstration effect, the overall rating for this component is *unsatisfactory*.

H. Future Operation

49. The national, provincial and county leaders have given considerable thought as to what type of institutional arrangements would safeguard the assets created under the project, provide a channel for loan repayment, provide training and service assistance to water plant staff, and continue the health education initiatives. In previous missions, the Bank Group had been informed that where budgets permitted, counties would like to retain the CPOs and expand their responsibilities to all rural water systems in the county. They would be responsible for new construction but would expand their capacity to focus more on supporting maintenance of the completed systems. During the ICR mission, however, the Bank Group was informed that the Government's personnel reorganization (designed to cut government staff levels by 40 to 50 percent) would mean that CPOs may not be able to continue to receive government budget allocations. The two provinces visited during the ICR mission stated that they were still reviewing their options, but that converting the CPOs into Rural Water Supply Factories or Companies (RWSCs) was one option they were considering. Apparently, the change of legal status would allow for

government budget support for at least the next couple of years. Other than purchasing spare parts and selling these to the water plants as requested (with no markup), the provincial and county leaders had no intention of charging a "service fee" to provide maintenance and repair services or for training of staff. These services would be useful in areas short of local materials distributors or mechanics, but the Bank Group has encouraged the CPOs and PPOs to consider charging small service fees soon, to avoid unfair competition with private service providers and so that as government budgets decline a separate revenue base could be built. In addition, transfer of all fixed assets was to be completed by project close, with the ownership of most systems residing with village committees or township governments (in the case where a system covers multiple villages). A third option is to allow the town or townships to manage the plants, since many of them have some kind of existing water supply entity for the township town. Health intervention initiatives will occur through existing service providers: doctors, women's committees, and through school programs.

I. Key Lessons Learned

50. There are five key lessons from this project that have been taken into consideration during the preparation of the follow-on National Rural Water Supply Project (Cr. N027-CHA) and Fourth Rural Water Supply and Sanitation Project (Ln. 4485-CHA/Cr. 3233-CHA). First, long-term loans to poor villages can complement village resources to sustainably and significantly improve water supply. The project demonstrates that government capital subsidies (if needed at all) can be substantially lower than typically argued for when discussing improved rural water for the poor. What the project does not reveal is how much of the success reflects the social capital built up during the era of collective action in Chinese villages during their now-ended period of communal organization. Second, demand for improved latrines is correlated with higher income levels, and, in contrast to improved water supply, the income levels of the rural poor in this project were too low to support the latrine improvement strategy. Third, investing in model villages is not a successful strategy for yielding demonstration effects when the external government financing needed to construct the model is not available to other villages seeking to replicate the model. Fourth, training of water plant managers, operators and accountants is critical to the sustainability of the water plant subprojects and proceeds of the Credit should be made available to ensure that adequate training is taking place. Fifth, intensified traditional approaches to health education have reached a saturation point. In order to increase the acceptance of health messages and behavior modification, the inhibitors for improved practice must be identified, and the health education program modified accordingly.

PART II: STATISTICAL TABLES

TABLE 1: SUMMARY OF ASSESSMENTS

A. Achievement of Objectives	Substantial	Partial	Negligible	Not Applicable
Macroeconomic policies				✓
Sector policies		✓		
Financial objectives	✓			
Institutional development	✓			
Physical objectives	✓			
Poverty reduction				✓
Gender issues				✓
Other social objectives				✓
Environmental objectives				✓
Public sector management				✓
Private sector development				✓
Other (specify)				✓

B. Project Sustainability	Likely	Unlikely	Uncertain
	✓		

C. IDA Performance	Highly Satisfactory	Satisfactory	Deficient
Identification		✓	
Preparation assistance		✓	
Appraisal		✓	
Supervision		✓	

D. Borrower Performance	Highly Satisfactory	Satisfactory	Deficient
Preparation	✓		
Implementation		✓	
Covenant compliance		✓	
Operation (if applicable)			

E. Assessment of Outcome	Highly Satisfactory	Satisfactory	Unsatisfactory	Highly Unsatisfactory
		✓		

TABLE 2: RELATED BANK GROUP LOANS/CREDITS

Loan/Credit Title	Purpose	Year of Approval	Status
Preceding operation			
Cr. 1578-CHA Rural Water Supply Project	Water supply; health education to rural areas	1985	Closed
Following operations			
Cr. N027-CHA National Rural Water Supply Project	Water supply; sanitation/health education to poor rural areas	1997	Implementation
Ln. 4485-CHA/Cr. 3233-CHA Fourth Rural Water Supply and Sanitation Project	Water supply; sanitation/health education to poor rural areas	1999	Board completed, not yet signed

TABLE 3: PROJECT TIMETABLE

Steps in project cycle	Date planned	Date actual/latest estimate
Identification (Executive Project Summary)	N/A	April 1990
Preparation	N/A	1990/1991
Appraisal	N/A	May-June 1991
Negotiation	N/A	December 1991
Board presentation	N/A	February 11, 1992
Signing	N/A	April 10, 1992
Effectiveness	N/A	July 23, 1992
Project completion	December 1997	December 1998
Loan closing	April 1998	December 31, 1998

TABLE 4: LOAN/CREDIT DISBURSEMENT: CUMULATIVE ESTIMATE AND ACTUAL /a

($ million)

	FY93	FY94	FY95	FY96	FY97	FY98	FY99
Appraisal estimate	26	51	76	94	107	110	
Actual	7.00	41.38	47.78	77.84	99.34	110.63	112.42/b
Actual as percent estimate	26.92	81.14	62.87	82.81	92.84	100.57	100.0
Date of final disbursement	08/03/93	06/29/94	07/27/95	06/24/96	07/11/97	03/24/98	05/24/99

/a Data from World Bank Group Loan Department.
/b Actual disbursed amount differs from the appraisal estimate due to changes in SDR/US dollar exchange rate.

TABLE 5: KEY INDICATORS FOR PROJECT IMPLEMENTATION

Not applicable for this project.

TABLE 6: KEY INDICATORS FOR PROJECT OPERATIONS

Not applicable for this project.

TABLE 7: STUDIES INCLUDED IN PROJECT

None

TABLE 8A: PROJECT COSTS
(Y million)

Item	Appraisal estimate			Latest estimate (6/30/98)		
	Local	Foreign	Total	Local	Foreign	Total
Water supply	319.3	322.7	642.0	549.0	666.7	1,215.7
Sanitation construction	31.3	0.0	31.3	43.9	0.0	43.9
Health and hygiene education	22.8	9.7	32.5	15.3	5.5	20.8
Technical assistance and training	26.9	8.4	35.2	7.4	2.6	10.0
Institutional establishment and project management	25.8	6.6	32.4	67.9	19.4	87.3
Total Base Cost	**426.1**	**347.3**	**773.4**			
Contingencies	177.0	144.1	321.2			
Total Project Cost	**603.1**	**491.5**	**1,094.6**	**683.5**	**694.2**	**1,377.7**

TABLE 8B: PROJECT COSTS
($ million)

Item	Appraisal estimate			Latest estimate (6/30/98)		
	Local	Foreign	Total	Local	Foreign	Total
Water supply	60.1	60.8	120.9	66.8	81.0	147.8
Sanitation construction	5.9	--	5.9	5.3	0	5.3
Health and hygiene education	4.3	1.8	6.1	1.9	0.7	2.5
Technical assistance and training	5.1	1.6	6.6	0.9	0.3	1.2
Institution establishment and project management	4.9	1.2	6.1	8.2	2.3	10.6
Total Base Cost	**80.3**	**65.4**	**145.6**			
Contingencies	23.9	19.5	43.5			
Total Project Cost	**104.2**	**84.9**	**189.1**	**83.1**	**84.4**	**167.5**

TABLE 8C: PROJECT FINANCING
($ million)

Item	Appraisal estimate			Latest estimate (6/30/98)		
	Local	Foreign	Total	Local	Foreign	Total
IDA	25.1	84.9	110.0			84.9
Domestic contribution	79.1	-	79.1			82.6
Total	**104.2**	**84.9**	**189.1**			**167.5**

TABLE 9: ECONOMIC COSTS AND BENEFITS

Not applicable.

TABLE 10: STATUS OF LEGAL COVENANTS

Agree-ment	Section	Cove-nant Type	Present Status	Original fulfillment date	Revised fulfillment date	Description of covenant/a	Comments
DCA	3.04	1	C			Borrower to open and maintain six provincial revolving accounts, each of an amount equivalent to three months' local expenditures by 4/30/92	
DCA	4.01(a)(i)	1	C			Borrower to maintain records and accounts of central components	
DCA	4.01(a)(ii)	1	C			Borrower to consolidate the audit of records and accounts of provinces.	
DCA	4.01(b)	1	C			Borrower to furnish annual audit reports including those of Special Account no later than six months after the end of each fiscal year.	
DCA	Sch.3.1	5	C			Borrower to maintain NPO with staffing and functions satisfactory to IDA.	
DCA	Sch.3.2	9	CD			Borrower to prepare and consolidate annual project implementation plan (PIP for the following year for IDA's review and approval by Oct.15 each year).	
DCA	Sch.3.3	5	C			Borrower to publish design manuals for nonpiped water supply facilities and sanitation facilities.	
DCA & PA	Sch.3.4 Sch.2.II.2	9	C			Responsibility for review of water supply system designs are : NPO: Y 2.0 million or more; PPO:>Y 500,000 - <Y 2.0 million; CPO: Y 500,000 or less	
PA	3.01(a)	1	C			Provinces to maintain records and accounts of activities and transactions within its jurisdiction.	
PA	3.01(b)	1	C			Province to furnish annual audit reports no later than six months after the end of each fiscal year.	
PA	Sch.I.I.A.2	10	C			ICB goods contract to be grouped in bid packages of $200,000 or more.	
PA	Sch.I.I.C	10	C			For civil works, > $400,000: by NCB, < $400,000: by local shopping with at least three quotations, <$20,000: by force account with aggregate total no more than $13.5 million. Total local shopping and force account not to exceed $ 63.0 million.	
PA	Sch.I.D.I	9	C			IDA to review contracts above $500,000 for goods and $2.0 million for civil works. Contract to be furnished to IDA prior to first payment out of Special Account.	
PA	Sch.2.1	5	C			Province to maintain PPO and CPOs satisfactory to IDA.	
PA & Minutes of Neg.	Sch.2.II.1	9	CD			Province to prepare annual PIP for following year by Sep. 1 of each year. PIPs to include information on high fluoride > 2.0 mg/liter villages.	
PA	Sch.2.II.3	3	C			Provinces to onlend credit at: maximum maturity of 20 years including 5 years grace; interest of 4% a year; provinces to bear all foreign exchange risks.	
PA	Sch.2.II.4	2	CP			Water charges to cover full O&M costs and depreciation or credit repayment, excluding grants from government.	

Covenant Class:
1 = Accounts/audits
2 = Financial performance/revenue generation from beneficiaries
3 = Flow and utilization of project funds
4 = Counterpart funding
5 = Management aspects of the project or executing agency
6 = Environmental covenants
7 = Involuntary resettlement
8 = Indigenous people
9 = Monitoring, review, and reporting
10 = Project implementation not covered by categories 1-9
11 = Sectoral or cross-sectoral budgetary or other resources allocation
12 = Sectoral or cross-sectoral policy/ regulatory/institutional action
13 = Other

Status:
C = covenant complied with
CD = complied with after delay
CP = complied with partially

Abbreviations:
NCB = National Competitive Bidding
PIP = Project Implementation Plan

/a Description of covenant includes the original fulfillment date.

TABLE 11: COMPLIANCE WITH OPERATIONAL MANUAL STATEMENTS

There was no significant lack of compliance with an applicable Bank Operational Manual Statement (OD or OP/BP)

TABLE 12: IDA RESOURCES: STAFF INPUTS

Stage of project cycle	Actual /a	
	Weeks	$'000
Preparation to appraisal	102.1	302.9
Appraisal	21.1	73.2
Negotiations through Board approval	7.1	25.6
Supervision	111.6	362.3
Completion /b	14.5	25.0
Total	**256.3**	**789.0**

/a IDA management information system did not record the planned staff-weeks and planned cost.
/b Completion figures are estimates only; actual figures not yet known.

TABLE 13: BANK RESOURCES: MISSIONS

Stage of project cycle	Month/year	No. of persons	Days in field	Specialized staff skills represented	Performance rating /a		Types of problems
					IP/b	DO/b	
Through Appraisal	N/A	N/A	N/A	Financial, engineering, economic, sociology, health education, environment	N/A	N/A	N/A
Appraisal through Board approval	May-Jun 1999	6	N/A	Financial, engineering, economic, sociology, health education	N/A	N/A	N/A
Supervision /c	Jun 1992	5	6	Financial, engineering, sanitation	N/R	N/R	Project Launch Workshop
	Jul-Aug 1993	6	21	Financial, engineering, sanitation, health	2	1	Pass through of foreign exchange risk to county; slow ICB preparation
	Jul-Aug 1993	5	16	Financial, health education, engineering, sanitation	1	1	ICB procurement delay, counter part fund delay, shortage of project office staff.
	Jul 1994	4	22	Health education, economic, engineering	S	S	Some project offices not adequately staffed; lack of NPO funding.
	Oct 1994	1	2	Economic	N/A	N/A	Informal discussions with Borrower in Beijing; ICB procurement delay, and lack NPO office funding.
	Apr 1995	1	2	Economic	U	S	Overall project delay due to slow ICB, lack of counterpart funds
	Nov 1995 & Jan-Feb 1996	4 4	19 30	Financial, engineering, economic, sociology, health education	S	S	Mid-term review; some counterpart funding delays; one year lag in water supply program; slow adoption of latrine program
	Oct-Nov 1996	7	13	Financial, engineering, economic, sociology, health education	S	S	Slow adoption of latrine program; one year lag in water supply program
	Nov 1997	3	8	Financial, engineering	S	S	Poor financial records; poor operational management
	Jan 1998	3	8	Financial, engineering	S	S	No problems in Guangxi
	Sep 1998	6	15	Financial, engineering, economic, sociology, health education	S	S	Possible misprocurement; poor financial records; tariff not covering debt service in some cases
Completion	Nov-Dec 1998	6	13	Financial, engineering, economic, sociology	S	S	Tariff not covering debt service in some cases, possible misprocurement

/a 1: Highly satisfactory; 2: Satisfactory; U: Unsatisfactory; S: Satisfactory.
/b IP: Implementation status; DO: Development objectives.
/c Since project task management transferred to the Resident Mission in February 1998, numerous meetings have taken place during which project issues were discussed. These meetings, which impact project supervision, are not shown in the table.

ANNEX A: BORROWER'S CONTRIBUTION TO THE ICR

I am very glad to inform you that NPO agrees, in principle, the ICR text agreed by the two sides through talking on the line on June 25, 1999. The effort and the sprit of cooperation made by the Bank are really appreciated.

Besides, I also want to inform you of the NPO's comments on the ICB management, i.e., to the causes for ICB procurement delay, NPO and the Bank should commonly shoulder the responsibilities. Especially in the process of ICB 1 and 2, NPO did not finish the bidding documents in line with the requirements of the Bank, as led to the delay of goods supply, hence hindered the overall progress of the project. On the Bank's side, the frequent change of task manager, too long the time of reviewing and approving the bidding documents, frequent changes of procurement experts, and different standards of reviewing and approving all bring impact to the ICB procurement delay. For example, after the review and confirmation of the first ICB bidding documents by the Bank, the procurement was completed. Yet, the second ICB procurement for the same goods/ materials/equipment, with the same bidding documents in use, was asked by a new expert of reviewing and approving the procurement to be changed greatly on its format, as is one of the causes of ICB procurement delay. This lesson is also to be learned.

ANNEX B: ICR MISSION'S AIDE MEMOIRE

November 23 to December 4, 1998

AIDE-MEMOIRE

A. INTRODUCTION

1. An IDA mission consisting of Ms. Dawn Vermilya (mission leader/financial analyst), Mr. George Plant (sanitary engineer), Mr. Mark Wu (project analyst), Mr. Charles Andrews (water supply specialist), and Ms. Li Xiaofeng (project assistant), visited Inner Mongolia and Yunnan between November 23 to December 4, 1998, to conduct the implementation completion mission (final supervision mission) for the Rural Water Supply and Sanitation Project (RWSS). Mr. Guy Alaerts (water quality specialist) accompanied the mission in Inner Mongolia to review fluoride issues, and Mr. Huang Ping (sociologist) accompanied the mission in Yunnan to review health education, sanitation and beneficiary participation issues. In each province and autonomous region the mission met with provincial leaders to discuss provincial project issues. Meetings were also held with the National Project Office (NPO), Inner Mongolia and Yunnan Autonomous Region Project Offices (PPOs), and the Tuoketuo and Baoshan County Project Offices (CPOs). A wrap-up meeting with the NPO, SDPC and MOF was held on December 10, 1998.

2. The mission expresses its sincere appreciation to the provincial leaders, NPO, PPOs, CPOs and officials of other agencies for the assistance and cooperation provided the mission. In particular, meeting arrangements with the Inner Mongolia Epidemiological Station and fluoride and arsenic specialists were valuable to the mission. This aide-memoire summarizes the findings and recommendations of the mission, as well as next steps on further preparation of the Implementation Completion Report. The main text of the aide-memoire deals with project-wide issues. A list of persons met is attached as Annex 1. Annex 2 is the government's draft Operational Plan for the project. Annex 3 is a summary of the mission findings on the status of fluoride contamination, monitoring and treatment in Inner Mongolia. Annex 4 is a summary of the audit irregularities to be addressed. Annex 5 contains Bank's advise on institutional arrangements for the water systems during the operational phase. The mission bases its views on the most recent national progress report as of June 1998 and site visits during the past year to Guangxi, Xinjiang, Gansu, Inner Mongolia and Yunnan (the Hunan visit was cancelled due to severe flooding).

B. PROJECT IMPACTS

3. In terms of physical achievement, the mission considers the project to be highly satisfactory. Based on the mid-term 1998 Progress Report, project beneficiaries total 7.92 million, but it is expected that by project close on December 31, 1998 the original target of 9.097 million beneficiaries will have received safe and sufficient drinking water, and this is further evidenced by the final connection rates seen in Inner Mongolia and Yunnan of 100% and 99%, respectively. A total of more than 2400 pipe water systems and 70,000 hand pumps and cisterns

will have been constructed by project close. The capacity of the systems built allows for future expansion to cover up to about 12 million beneficiaries. Where improved water supply systems have been installed and complemented by health and hygiene education and improved sanitation facilities, clear benefits have accrued to the beneficiaries. The nature of these benefits vary depending on the initial water and health problems. The problems addressed in this project have been numerous and include: seasonal lack of water, polluted water sources, high fluoride and arsenic content water, remotely located water sources, high levels of dysentery, hepatitis and other water-borne diseases. The more dramatic the original water problem, the greater the accrued benefits have been to the village beneficiaries, but in almost all cases beneficiaries view the project as having substantially reduced their time to fetch water and/or improved their families' long-term health. Physical targets for health and hygiene education training and project office staff training are also likely to be fully realized, if not exceeded. The revised estimates for the sanitation program are also likely to be met, if not exceeded. Based on the improved emphasis on training, the mission upgraded the status of training from unsatisfactory to satisfactory.

4. Concerning institutional establishment and long-term sustainability of project assets, the mission is concerned with the deterioration of both cost recovery levels and water system maintenance practices seen in the past two missions. Based on the findings of the last two missions, the Bank is concerned that unless improvements are made on both counts a significant portion of the piped water systems will have a reduced service life and therefore reduce the project's future impact. For this reason, the mission downgraded the status of financial covenants (cost recovery) from satisfactory to unsatisfactory. Further investigation is expected to clarify the extent of the problems with cost recovery and the underlying reasons at which time the status of financial covenants may be reverted to satisfactory.

5. Beneficiary participation though modest during the feasibility and design stages, has had a strong impact in altering the type of water supply system received-- hand pump systems were converted to piped water systems, and in reducing the scale of the sanitation program -- it was cut in half. This reflects beneficiaries increased ability to pay for a higher service standard, and beneficiaries have contributed well over 25% of the upfront project costs, plus have paid substantial amounts to cover the costs of house hold connections (these costs are outside the project scope) and continue to support the majority of systems through substantial tariff payments. Beneficiaries have shown much less willingness to invest their own funds and time in upgrading their private sanitation facilities.

6. The Borrower provided its views on implementation phase of this project. As of June 30, 1998, 2318 water plants have been constructed, 87.27 percent of the original plan have been finished. 8.89 million rural residents have been benefiting from the project. During last five years, 84 demonstrative villages have been established. Local beneficiaries benefited from the improved sanitation and health education and initiated to set up 12 demonstrative villages and 7,124 household latrines in non project areas. Through project implementation, economic benefits and social impact has improved remarkably as well as having access to improved water. A survey conducted by the NPO shows about 203 water plants revenue exceed their cost; 960 water plants are not fully covering their operation and depreciation costs. Hunan, Guangxi and Xinjiang have fared the best on cost recovery. The Borrower thinks government subsidies can solve the cost recovery issue.

C. PROJECT MANAGEMENT

Project Offices

7. The National Project Office is an experienced team but is understaffed to meet the needs of simultaneously implementing two projects and preparing a third project and managing the other responsibilities of the NPHCC's water supply program. In general, the provincial project offices visited in Inner Mongolia and Yunnan have reasonable staff levels and competency. The Yunnan and Inner Mongolia PPO staff levels are presently stressed because they have been implementing two projects at the same time (RWSS and NRWS) but this is expected to improve soon with the completion of RWSS. County Project Offices visited vary in capacity, but generally the staff employed are qualified and diligent. In most project offices visited there was little turnover of technical staff during the project.

Disbursements and Reallocation of Credit Proceeds

8. As of February 8, 1999, the Credit has disbursed SDR 112,156,709.97 (US$ 78,708,620.87 equivalent). This represents 99.8% of the Credit. The Bank received a request from the Ministry of Finance on November 16 to reallocate credit proceeds from the Goods, Consulting Services & Training and Unallocated categories to Civil Works. The Bank reallocated the Credit proceeds as requested before project close on December 31, 1998.

Audit Findings

9. County audit reports in the five provinces (except for Hunan) have been reviewed during the past two missions. County audit reports have in many cases provided good detail on problem areas and areas for improvement, but some have been weak in identifying procurement related problems (see para. 23). The mission requests that the audit discrepancies in Annex 4 for Yunnan and Inner Mongolia's 1997 audit reports be explained or rectified before April 15, 1999. Based on the responses, Association management will decide whether Credit proceeds should be returned to the Association.

D. HEALTH EDUCATION AND SANITATION

Health Education

10. By June 30, 1998, more than 8.1 million people had been trained under the project of which 43% were men, 36% were women and 20% were children. In addition, almost 192,000 people have been trained as trainers and are capable of continuing to spread the health messages generated under the project. The largest group trained for this purpose are community women, totaling more than 127,000.

11. In a Yunnan report, based on sampling interviews and observation, it appears that behavior changes have been significant when compared with baseline survey data. Use of latrine has risen for housewives from 91.6% to 95.2%, and for school-aged children from 43.6% to 85.95%. The incidence of washing hands before eating has risen for housewives from 2.9% to 83.2%, and for school children from 55.7% to 97.5%. Drinking boiled water among housewives has risen from 15.8% to 74.7%, and among school children from 24.8% to 93.39%. As the report realizes, there may be many other factors such as socio-economic development which have played roles in these behavior changes, but nonetheless the project itself did help beneficiaries to

improve their hygiene behavior and sanitation environment. The mission recommends that all project counties and provinces include such survey results in their completion report.

Sanitation

12. Sanitation targets (revised at mid-term) have been exceeded. As of June 30, 1998, latrine coverage has reached 106% of target, animal enclosures have met its target, garbage dumps and drainage canals have exceeded targets. In total, 75 demonstration villages have been completed, which meets the targets set at the mid-term review.

E. FINANCIAL PERFORMANCE

Project Expenditures

13. As of June 30, 1998 project investment totaled Y1,378 million, or 126% of original estimate. Total project investment as of December 31, 1998 is expected to rise to about 150% of the original estimate once the reallocation takes place, and civil works and ICB allocations are finalized. About 88% of project investments have been spent on water supply, to date.

Counterpart Funds

14. As of June 30, 1998 counterpart financing had reached 93% of the revised commitment levels (commitment levels were revised upward by 39% at Mid-term Review). Both Xinjiang and Yunnan have performed very well and have surpassed their targets by 137% and 105%, respectively. Beneficiaries in all provinces have exceeded their planned contributions (both cash and in-kind) by an average of 124%.

Cost Recovery

15. As of June 30, 1998 the Progress Report showed that average water charges did not cover average water costs (O&M and debt service) in Inner Mongolia and Yunnan, and Gansu did not report on the matter. This in combination with the site inspection in Baoshan County, Yunnan, which showed a general problem with cost recovery, especially to cover the debt service, has prompted the mission to seek further clarification on the extent of the problem. After reviewing three sites in Baoshan, the mission concluded that in two cases relatively small tariff increases would be required to meet debt service repayment responsibilities and the third plant would need a more substantial increase to the same level as anticipated for the other plants.

16. During its mission, the team observed three main areas which contribute to the cost recovery difficulties in Yunnan. First, in many instances, facilities were overdesigned. The water consumption estimates used for planning purposes were unrealistically high, and in reality, plants may be operating at only half of their actual capacity. Residents in many areas are still resorting to their original water sources for tasks such as washing their clothes, bathing, and feeding the animals, and using the new improved water for drinking and cooking purposes only. Second, in many areas, there are problems with collection of tariffs. In a number of plants visited during the mission, tariffs were collected only on one-third to one-half of the water actually produced. Inadequate tariff collection appears to stem from two sources: water theft and lapses in collection time. In a number of instances, villagers have determined techniques to obtain water without activating their meters, and using this stolen water to irrigate their fields. Also, there are extended gaps in between collection times in some villages, with the end result that the tariffs are not

collected on water used during this gap period. Finally, a possible third cause of cost recovery difficulties is that beneficiaries do not appear to understand that their new systems were financed through World Bank loans and need to be repaid through tariff collections. This was not explained to them at the time of the systems' construction, nor were initial tariffs set high enough for them to understand this. This may therefore contribute to their willingness to steal water and their poor efforts in tariff collection.

17. The mission requests that Yunnan and Inner Mongolia Autonomous Region Project Offices to report by March 15, 1999 the name of the facilities not meeting cost recovery terms, the number of beneficiaries affected, and whether the plant is currently earning enough through revenues to cover operations and maintenance and a portion of debt service, or whether the revenues don't even cover debt service in an attempt to further clarify the situation.

Financial Management of Water Systems

18. The mission found the quality of financial management to be highly variable atthe water plants which it visited and would recommend further financial training of staff at water plants in both Inner Mongolia and Yunnan. While in some instances, extensive receipts were kept of expenses and tariff collection, in others, staff had poor records and no knowledge of debt repayment obligations. The mission also found one instance in Inner Mongolia of funds for a water plant being kept in a personal bank account, and reminds project offices to notify plant staff that funds must be kept in a separate official bank account. In another case in Yunnan, the bank account statement didn't reconcile with the cash balance (apparently because household meters had been purchased by the water plant to provide to households free of charge to encourage them to return to a metering system). Also, provincial and county project officials should pass on relevant information concerning the schedule of debt repayment to water plant staff in order to better help them assess their financial situation. In Inner Mongolia, water plant account staff were frequently not available and records sometimes locked away.

F. TECHNICAL SUSTAINABILITY

Engineering

19. Design and construction of water supply systems is generally satisfactory. Engineering aspects may impact service sustainability as follows:

- Some system designs may not represent "least cost options". But this applies only to water abstraction and transmission capacity, and is probably not significant vis-à-vis service affordability and willingness-to-pay.
- Apparently optimistic billable water consumption design parameters have resulted in actual operating levels significantly below design capacities. It is probably too early to tell whether this under-utilization is a permanent state and thus a result of system "overdesign".
- Certain "outlier" engineering deficiencies may shorten the service-life of individual water plants, or compromise water quality unless rectified, e.g. improperly installed main meters, well heads not sealed, poor ventilation and drainage at installations, improperly installed household meters.

PPO and CPO Design and Construction Supervision

20. Construction supervision appears to have been adequate. But some sub-project feasibility studies have clearly not evolved appropriate, least cost service options for consumers. This

reflects upon CPOs' design capabilities, and the PPO's supervision performance. This is a key area for improvement in subsequent projects.

Operations and maintenance

21. Water plants are presently delivering a reliable service of clean water to satisfied consumers. But O&M practices and regimes need to be improved to ensure the continuation of these service levels, particularly production monitoring and recording, certain key preventative maintenance procedures, ability to carry out basic repairs, and water disinfection.

Effectiveness of operations and maintenance training

22. O&M training has not yet achieved requisite O&M competencies and incentives amongst water plant operators and managers. More training and constant retraining will be necessary. Water plant staff turnover has been high, particularly amongst accountants.

G. PROCUREMENT

23. In both counties visited the method used for procurement of civil works above the force account limit was not in accordance with World Bank guidelines. In Tuoketuo County non-force account civil works contracts were negotiated and in Baoshan County the Government of China procurement regulations were followed and marking was used. The Bank asked for and received reports from both counties to better determine the effect of the procurement practice used on the final selection of contractor and on the difference of the contract price to that of the engineering design cost. The mission will forward its findings to Bank Management for guidance on whether the procurement practices as constitute misprocurement. Due to these findings the mission has downgraded the project's procurement status from satisfactory to unsatisfactory.

H. FLUORIDE AND ARSENIC CONTAMINATION IN WB-FINANCED INVESTMENTS

24. In Inner Mongolia, fluoride and arsenic are found in many aquifers, often in concentrations exceeding national standards. Annex 3 provides an overview of the current knowledge regarding the occurrence of fluoride and arsenic, and the technological options for their removal.

25. Tuoketuo County is generally considered a "hot spot" for fluoride and, to a lesser extent, for arsenic. Fluoride would occur in different concentrations in different places but be of a county-wide concern, whereas high arsenic concentrations were found in only some of the villages. Not all wells or villages have been analyzed for arsenic as yet, but the (now derelict) shallow wells in Naizegai have arsenic levels that exceed the standards. In addition, ample evidence shows that the shallow wells, which were before the project the means of the rural population to have access to water, had been supplying water with a substantially higher fluoride concentration than the deeper wells that have been installed by the project. The county Anti-Epidemic Disease Station samples all water plants twice annually and follows the development of the fluoride concentration since several years. The record on arsenic is less complete so far. None of the water plants under this project is reported to contain arsenic in levels exceeding national standards.

26. The mission gave particular attention to three water plants containing too high fluoride levels (Yongshengyu, Dabeiyao and Masiyao). Although the CPO believes that the analysis results suggest a gradual deterioration of the fluoride contamination over the past two or three years, the mission rather concluded that the scatter in the analysis results suggests that the trend is not statistically significant.

27. The mission inspected a small filtration pilot plant for fluoride removal based on the "boiled stone" technology of Hohhot University (see Annex 3) in Yongshengyu. Three months of experimenting have been concluded and data are currently being analyzed. If this material proves to be an effective adsorbing medium, the CPO will install full-scale filters in the mentioned water plants. Importantly, the CPO has agreed earlier to not consider installing household-based filters because such decentralized treatment may be less reliable and more costly in view of the fact that the filter's operation does require a minimum of technical capacity and diligent operation. Concern exists about the technical feasibility, the cost, and the institutional complexity of the fluoride removal technologies in rural water supply. This argues against early investment in additional fluoride removal filters.

28. It is recognized that all plants still yield water with some fluoride, of which the concentration in some cases exceeds the standards. However, also in the latter cases the fluoride content of the new water supply is much lower than in the pre-project situation. Because the disease incidence and seriousness are directly proportional to the daily intake of fluoride (and arsenic), it can be concluded that the project has led to a substantial improvement in the quality of the drinking water, and hence, has a positive impact on health. Installing fluoride removal filters, of which the feasibility remains to be demonstrated, has a high opportunity cost as many counties in Inner Mongolia have not yet been equipped with improved water supply. Therefore, the project has been cost-effective.

29. It is recommended that the County Anti-Epidemic Disease Station analyzes the water of the plants on an annual basis only but in a more systematic fashion for both fluoride and arsenic, and that the accuracy of the analyses is improved. An important objective of this monitoring is to detect at an early stage any new leaching of the contaminants from the soils into the wells. Similarly, the efforts to develop a feasible and cheap method for fluoride removal in the rural setting should be stepped up. It is suggested that the World Bank could consider providing financial assistance for this purpose under a subsequent rural water supply loan.

I. INSTITUTIONAL ARRANGEMENTS FOR SUSTAINABILITY OF PROJECT INVESTMENTS

30. The National Project Office has prepared a draft Operational Plan which is in Annex 2.

31. The provincial and county leaders encountered had given considerable thought as to what type of institutional arrangements would safeguard the assets created under the project, provide a channel for loan repayment, provide training and service assistance to water plant staff, and continue the health education initiatives. In previous missions, the Bank had been informed that where budgets permitted counties would like to retain the CPOs, but expand their responsibilities to cover all rural water systems in the county. They would be responsible for new construction but would expand their capacity to focus more on maintenance of the completed systems. During this mission, however, the mission was informed that the Government's personnel reorganization (designed to cut Government staff levels by 40-50%) would mean that CPO's may not be able to

continue to receive Government budget allocations. The two provinces visited stated that they were still reviewing their options, but that converting the CPOs into Rural Water Supply Factories or Companies (RWSCs) was one option they were considering. Apparently, the change of legal status would allow for Government budget support for at least the next couple of years. Other than purchasing spare parts and selling these to the water plants as requested (with no markup), the provincial and county leaders had no intention of charging a "service fee" to provide maintenance and repair services or for training of staff. The mission encourages the CPOs and PPOs to consider charging small service fees soon, so that as Government budgets decline a separate revenue base could be built. In addition, transfer of all fixed assets will be completed by Project Close, with the ownership of most systems residing with village committees or township governments (in the case where a system covers multiple villages). Health intervention initiatives will occur through existing service providers: doctors, women's committees, and through school programs. Bank reviewed with the Borrower international experience of alternative institutional arrangements during the operational phase of the project (see Annex 5).

J. ICR PREPARATION STEPS

32. The mission discussed preparation steps for the ICR in detail with the staff from the NPO. The mission provided NPO with (i) a Chinese version of the World Bank's ICR Preparation Good Practices, and (ii) an outline for the Operational Plan (see Annex 2). The mission requests that the draft of this Operational Plan be provided to the Bank by end mid-March 1999 for its comments, and a final version by end April 1999. By March 15, 1999 the World Bank should supply a draft of the Implementation Completion Report to NPO for its review and comments. By March 15, 1999 NPO should provide a draft of its Evaluation Report to the Bank and its final version by May 15, 1999. The ICR will be published by June 1999.

ANNEX B

ANNEX 1

PERSONS MET

Mr. Chen Huan	Deputy Division Chief, Ministry of Finance
Ms. Hou Yan	Division Chief, State Development and Planning Commission
Mr. Zhang Yiren	Standing Deputy Director, NPO, CRWSSP
Mr. Liu Jiayi	Deputy Director, NPO, CRWSSP
Mr. Luo Fengji	Deputy Division Chief, NPO, CRWSSP
Mr. Shi Risheng	Deputy Division Chief, NPO, CRWSSP
Mr. Zhao Zhenrong	Acting Division Chief, NPO, CRWSSP
Mr. Meng Shuchen	Division Chief, NPO, CRWSSP
Mr. Wang Zhanshe	Interpreter, NPO, CRWSSP

Inner Mongolia Autonomous Region

Mr. Bao Jinsheng	Deputy Director, Autonomous Region Health Bureau
Ms. Li	Division Chief, Autonomous Region Financial Bureau
Ms. Bao Lanman	Project Officer, Autonomous Region Financial Bureau
Mr. Guo Yigang	Director, PPO
Ms. Li Wenhua	Director, Hohhot Project Office
Ms. Guo Yaqin	Accountant, PPO
Mr. Qi Yibin	Accountant, PPO
Mr. Zhang Ziyuna	Project Officer, PPO
Mr. Kou Wenhua	Project Officer, PPO
Ms. Ren Lihua	Interpreter

Tuoketuo County

Mr. Zhao Zhenbing	Magistrate
Mr. Yue Gaohui	Secretary General
Mr. Jiang Shouzhi	Chairman, County People Congress Commission
Mr. Gao Shanfeng	Deputy Magistrate
Mr. Kang Xiaohu	Deputy Magistrate
Mr. Zhai Zhenxiong	Director, CPO
Ms. Ma Yuzhen	Deputy Director
Mr. Liu Guoping	Engineer, CPO
Mr. Li Guanghu	Accountant, CPO
Mr. Fu Lianyao	Project Officer, CPO
Mr. Li Zhenbi	Project Officer, CPO

Yunnan Province

Mr. Yang Chaobin	Deputy Director, Provincial Health Bureau
Mr. Lu Yunsong	Deputy Division Chief, Provincial Development and Planning Commission
Mr. Du Biao	Deputy Division Chief, Provincial Development and Planning Commission
Ms. Lu Xuefan	Project Officer, Provincial Development and Planning Commission
Ms. Shen Fan	Project Officer, Provincial Finance Bureau

Mr. Zhao Hongshen	Acting Director, PPO
Mr. Wan Jixin	Accountant, PPO
Mr. Luo Yanghang	Engineer, PPO
Ms. Yang Xuemei	Accountant, PPO
Mr. Zeng Qingyun	Interpreter

Baoshan County

Mr. Yang Jingjian	Mayor
Mr. Chen Xuefan	Vice Mayor
Mr. Yu Zhiqiu	Director, City Bureau
Mr. Yang Zhengjun	Deputy Director, City Finance Bureau
Mr. Li Jiabin	Project Officer, City Finance Bureau
Mr. Huang Jian	Deputy Director, City Planning Bureau
Mr. Yang Yuhui	Deputy Director, Prefecture Health Bureau
Mr. Gao Zhixian	Director, City Health Bureau
Mr. Yu Yingbo	Deputy Director, City Health Bureau
Mr. Zhao Weidong	Director, CPO
Mr. Zhang Yanglin	Deputy Director, CPO

ANNEX 2

DRAFT OPERATION PLAN

The National Project Office (NPO) conducted a water plant operation survey in December 1998. Based on the survey, NPO thinks all water plants should strengthen operational management and technical assistance because sustainability is critical to this project. In order to better operational performance in the future, NPO drafted the following operation plan:

1. Water plants, in which water supply production hasn't reached full capacity, should strengthen mass mobilization, encouraging local peasants to adopt household connections, so that the water plant's revenue can cover its costs. NPO will coordinate local governments to speed up household connections and increase beneficiaries.

2. In most water plants water is not regarded as a kind of commercial good, which is the key reason why water plant's revenue does not cover their costs. NPO will strengthen training for trainers in order to instill the concept that water is a commercial good. In the meantime, training courses should particularly focus on financial management.

3. Regarding CPOs conversion, there are three options at present. One is to continue the existing CPOs operation if possible. NPO prefers this option because CPOs are very familiar with the project and sustainability can easily be assured if management is strengthened and service levels are improved. Converting the CPOs into Rural Water Supply Factories or Companies is the second option. The last option is to transfer all fixed assets to townships or towns and water plants will be managed and operated by townships or towns.

NPO is considering the conversion and functions of CPOs and water plants as one of the most important matters. NPO will discuss these issues with related agencies and hope they can be solved during the provincial/prefecture and county governments' institutional reform.

ANNEX B

ANNEX 3

FLUORIDE AND ARSENIC CONTAMINATION OF GROUNDWATER IN INNER MONGOLIA

A substantial part of the Inner Mongolia region is known to have groundwater aquifers containing moderate to high concentrations of fluoride. In addition, in specific areas the groundwater also has been reported to contain high concentrations of arsenic.

The region contaminated with fluoride is identified to cover a 60-160 km wide belt that runs west to north-east over a distance of approximately 1,400 km, from west of Linhe to Chifeng and Ulanhot. In shallow groundwater, concentrations can vary from below 0.7 to well above 4 mgF/l. Some areas in this belt are to be considered "hot spots", with a high proportion of the wells (more than 50% of those tested) containing fluoride concentrations of 2-4 mg/l. Among those hot spots are Tuoketuo (Togtoh) County and possibly small parts of adjacent counties.

Five areas are reported to be contaminated with arsenic: a small zone close to Chifeng; a strip of contingent counties including Tuoketuo County, the western part of Helinger (Hohinger) County that borders Tuoketuo County, and Tumd Right-banner (Youqi) County which lies between Tuoketuo County and Guyang County; larger areas in the Bao Meng region (between the Yin Shan mountain range and the Yellow River, around Baotou and Wuyuan); areas west of Bengkou; and some areas on the Loess Plateau across the Yellow River south of Bao Meng. In contrast to the other areas, Chifeng lies some 600 km to the east of Hohhot and is clearly isolated from the other contaminated areas, which all lie to the west of Hohhot. The arsenic contamination near Chifeng is of a very localized nature and is limited to spring water, which suggests a mineralogical origin. The arsenic presence west of Hohhot is of a more diffuse nature and seems associated with both the shallow and deep alluvial sediment layers. Typically, the shallow layers (5-25 m deep) and their groundwater tend to have higher fluoride and arsenic levels than the deeper layers, although this situation may be reverse for particular wells. The JICA study (1997-1998) has compiled data on 16,000 predominantly shallow wells in the Bao Meng area and in Tuoketuo. The highest concentration reported in Bao Meng is 3 mgAs/l, and some 1,600 arsenicosis patients have been identified. Nonetheless, it is recognized that these studies can only be considered as preliminary. A study in three villages in the Hohhot Basin in the early nineties revealed one third of the analyzed shallow and deep wells to contain arsenic levels above the national standard; the prevalence of arsenicosis patients was 5.8%.

The areas with high fluoride and high arsenic levels overlap to a limited degree, but it is clear that fluoride is more widespread.

The geological complexity of the sediment deposits in the region strongly suggests that very localized geo-hydrological phenomena can occur, although it seems practical and reasonable to describe the average groundwater contamination situation for planning purposes on a scale of a county. The heterogeneity of the sediments is borne out, for instance, by the fact that in Tuoketuo County quite a number of artesian wells can be found, whilst neighboring villages have much deeper water tables of -20 or 30 m.

National drinking water standards define the maximally allowable level of fluoride in rural water supplies at 1.5 mgF/l ("Grade III quality", or poorest allowable quality), which exceeds the 1.0 mg/l level applicable to urban supplies. The maximum for arsenic is 0.050

mgAs/l, which corresponds to the maximum allowable concentration set by the World Health Organization (the WHO recently set the maximum advisable concentration at 0.010mg/l).

Physico-chemical technologies to remove fluoride from water are available and have been demonstrated to be feasible. These technologies are often based on filters containing ion exchange resins or inorganic adsorbants (such as calcium oxide, phosphate, and/or alumina). Removal of arsenic, on the other hand, is less obvious, and few technologies are currently available that are easy to operate and maintain. However, all these technologies tend to be rather expensive and require a higher degree of technical and management capacity from the operator. Although feasible for larger-scale urban water supply, there is no straightforward removal technology option available for the small-scale rural operations under the projects' purview. Presently, the Chemical Department, Hohhot University (Prof. Li Tu Xing), conducts experiments for fluoride removal at field level with a pilot plant using "boiled stone" (composition as yet not communicated to the mission) that is mined from a location 60 km from Hohhot. If proven to be technically and institutionally feasible, this option may also be sufficiently cheap. It is estimated that the depreciation and O&M cost would amount to 0.2-0.3 Y/m^3, which is typically 10-20% of the total cost for a regular plant without the fluoride removal. This cost could still be carried by most of the consumers. However, for arsenic, no removal options are currently available that are both cost effective and technically feasible under rural conditions. The National Project Office is not considering arsenic removal technologies, beside the option of searching for a well location or a well depth that yields safe water.

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Luo Zhen-dong, Zhang Yu-min, Ma Liang, Zhang Ge-you, He Xingzhou, Wilson R., Byrd D., Griffiths J., Lai Shenghan, He Lili, Grumski K., and Lamm S.H. Chronic Arsenicism and Skin Cancer in Inner Mongolia – Consequences of Arsenic in Well Water. *Proc. SEGH Meeting*, San Diego, CA, 1995.

The 1995 report by the Hohhot Sanitation and Anti-epidemic Disease Institute Preliminary, and results of a JICA sponsored study (1997-1998) (information conveyed by Prof. Li Sumei, Director. It should be noted, however, that the mission did not have the opportunity to directly talk to members of the JICA study team).

Analysis results of well water compiled by the Tuoketuo County Anti-Epidemic Disease Station.

Notes of a discussion with Mr. Liu Jiayi, Deputy director, National Project Office, National Patriotic Health Campaign, Beijing, May 15, 1998.

ANNEX B

ANNEX 4

AUDITING IRREGULARITIES (1997 AUDIT)

Inner Mongolia Autonomous Region

Inner Mongolia PPO:
1. In September, 1997, PPO lent RMB 100,000 to non-project office; as of today, not repaid.
2. In December, 1997, PPO lent RMB 25,000 to Foreign Economy Division, Inner Mongolia Financial Bureau; as of today, not repaid.

LinXi CPO
1. RMB 9,980.38 improper expenditure;
2. RMB 99,883.99 account receivable to be deferred;

Hohhot City Project Office:
1. "IOU" materials value reached RMB 104,600;
2. RMB 265,100 worth of materials and pumps were recorded in red ;
Accumulated intercompany account reached 661,400; and other accumulated account receivable reached 61,800. All of these were private borrowing.

Tuzuoqi CPO
1. Illegal expenditure reached RMB 104,100.
2. RMB 4,900 management fee was over withdrawn; RMB 3,100 commitment fee was over withdrawn.

Tuoketuo CPO:
1. In the audit report, it mentioned that some problems were found but not sorted out.

Yunnan Province

Chuxiong City Project Office
1. RMB 419,728.28 worth of materials lost;
2. RMB 73,000 counterpart fund appropriated from beneficiaries could not be used for the project. Among which RMB 5,000 was held by Fayi Office; RMB 23,000 of the fund was used to construct office building by Ziwu Water Management Station.

Qiaojia CPO
1. RMB 73,189.28 field survey and exploration cost without formal invoice

Yunxian CPO
1. RMB 76,000 provision for debt service were diverted to repay the revolving fund to the Financial Bureau.

Mile CPO
1. Some financial accounts could not be recorded properly.

Baoshan CPO

1. Due to poor management , water tariff collection in some of water plants could not cover staff's salary. Such as, Xinguanghe Water Plant.
2. RMB 365,000 project fund were used for office building and dormitory construction.

ANNEX 5

ALTERNATIVE INSTITUTIONAL ARRANGEMENTS FOR OPERATIONAL PLAN

WORLD BANK ADVICE TO BORROWERS

A. INSTITUTIONAL OPTIONS

1. Two guiding principles

Examples of umbrella service organizations successfully and sustainably "intermediating" between their "client" water supply and sanitation (WSS) system owners/operators and commercial service providers[1] seem to present at least two common "guiding principles". They are linked, and not surprisingly relate directly to incentives for efficient and effective value adding:

- Competition: Regulatory and subsidy arrangements should not unreasonably obstruct fair and open competition in the service market.
- Commercial viability: Positive cash flows are the best assurance of sustainability of service provision.

2. County Rural Water Supply and Sanitation Company

During the World Bank's RWSS II Implementation Completion Mission (ICM) in November/December 1998, provincial and county project officers suggested the "*County Rural Water Supply and Sanitation Company*" (Coys) as one possible institutional option for ensuring the sustainable delivery of WSS services after project implementation. The model described by different officers had certain key commonalities:

- Re-tooled County Project Offices (CPOs): The coys would essentially be the CPOs but with different mandates delivering different services -- from project implementation to operational support.
- With some ongoing National government funding support: Given the long and "laudable" history of National government social welfare support in China, some continuing level of on-going government subsidy for the coys was argued to be both necessary and desirable. There was no definitive discussion on a notional schedule or mechanism for phasing out this support.

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[1] The *PROSANEAR* urban environmental sanitation program in Brazil rests, inter alia, on the successful operational phase intermediation between poor communities and market service providers. Although the market and the services are somewhat different, the concept is directly relevant for RWSS II. The *Water and Sewerage Construction Company* (WASECO) in Ho Chi Minh City in Vietnam provides an interesting example of operational phase technical and management support, including training of local operators ahead of the transfer of assets. In the Philippines, the AusAID -assisted *Central Visayas Water and Sanitation Project* has been followed up with a Federation of WSS service co-operatives established through the project, across the four participating provinces (each about the size of a typical county in China).

- Providing a range of operational support services: The mission and project officers discussed the range of service which might be properly provided by these coys, including training, bulk procurement of spare parts and system expansion materials and equipment, operations and maintenance advice, technical repairs, and financial management assistance including collection and bundling of IDA credit repayments.
- Partially on a commercial basis: Project officers acknowledged that some of these services should be provided on a commercial basis, and could therefore generate an independent cash flow for the coys, especially the supply of spares, goods and materials.

3. Compliance with the "guiding principles"

The notion of an umbrella organization serving project-initiated small WSS system operators is conceptually sound; and the model explained by the Bank's interlocutors may be reasonable for the project counties at this time. However, the model suffers two potentially fatal deficiencies:

- Net negative cash flows: The model assumes that government subsidies will be necessary, *ad infinitum*. In this sense, the proponents see the coy as a CPO, but who's function is to deliver government sponsored operational support instead of implementation support. Even if government were to accept this arrangement initially, its policy on subsidies would inevitably change, the public benefactor will disappear, and with it the bankrupt coy. Some level of government subsidy during a defined transition phase may or may not be necessary and wise. But whatever the arrangement, **no services should be offered to the WSS system operators on less than a commercial basis unless for commercial strategic reasons** (e.g. a deliberate loss-leader position to establish a sub-market). A positive cash flow is any organization's best guarantee of survival.
- Market distorting subsidies: Any government subsidy for the coy will distort the market for providing those services, potentially disqualifying more suitable contenders, and downgrading the quality of service. It may be, for instance, that pre-existing county town water supply companies would be more competitive in providing some or all of the services envisaged. It is conceptually incorrect to assume that the CPOs are best placed to provide these services. **No subsidy arrangement should disqualify potential commercial competitors**. Open and fair competition ultimately maximizes customer satisfaction and continued demand for those services.

4. Some variations and lessons learned

Umbrella company owned by the WSS system operators: The coy. may be owned by the system operators who have subscribed for stock in the coy. This underpins the relationship between the CVWSP WSS cooperatives and their Service Federation in the Philippines (see footnote 1). The Federation's shareholders are the WSS cooperatives who have subscribed Pesos 150,000 to establish the Federation's capital base. There is no government support or interference, and the WSS cooperatives have total discretion over their dealings with the Federation. Each has an absolute interest in the well-being of the

other. But it is too soon to draw conclusive lessons from this experience; and it suffers the same anti-competition risks suffered by any vertically integrated conglomerate.

Integration of project implementation and project operation; and project replication: In the successful WASECO example in Vietnam, the company packages each project as a small-scale *build-operate-transfer* scheme. After signing a service contract with a participating commune, WASECO borrows funds from local banks to finance construction. The coy. then operates the system and charges an agreed tariff, for five to seven years. Tariffs are always sufficient for full cost recovery. Households pay the full cost of connections from the street to the house. Following construction, the coy. provides training for local system operators to ensure operation sustainability after transfer of assets.

There are three important lessons for RWSS II:

- The importance of full cost recovery and the advantages of engendering fiscal and commercial discipline from the start of the operations phase;
- As an example of how to replicate the project to other villages, and the potential for expanding the coy's immediate scope of services and its eventual service market; and
- An example of a government-owned company -- WASECO -- locking in a viable long-term future.

MAP SECTION

IBRD 23276

CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
NORTHERN PROVINCES

Project Counties
Prefecture Seats
Province Capitals
National Capital
Prefecture Boundaries
Province Boundaries
International Boundaries

0 100 200 300 400 500
KILOMETERS

MONGOLIA
XINJIANG
QINGHAI
XIZANG
SICHUAN
HEILONG-JIANG
JILIN
LIAONING
NEI MONGOL
BEIJING SHI
TIANJIN SHI
HEBEI
SHANXI
SHAANXI
NINGXIA
GANSU
SHANDONG
HENAN
JIANGSU
ANHUI
HUBEI

Altay
Beitun
Bole
Jinghe
Yining
Kuytun
Shihezi
Wujiaqu (Changji)
Urumqi
Toksun
Hami
Aksu
Kuqa
Luntai
Korla
Artux
Kashi
Shule
Akto
Shache
Moyu
Hotan
Hailar
Arun
Ulanhot
Changchun
Abagnar Qi
Linxi
Tongliao
Naiman
Chifeng
Shenyang
Linghe
Tumd Zuo
Hohhot Suburb
Hohhot
Togt
Jining
Dalad
Dongsheng
Ejin Horo
Yumen
Jiayuguan
Zhangye
Minle
Jinchang
Alxa Zuoqi
Yinchuan
Wuwei
Xining
Yongdeng
Jingyuan
Lanzhou
Linxia
Hsining
Dingxi
Lintao
Yongwei
Xiahe
Hezouzhen
Tianshui
Qincheng
Beidao
Huixian
Wudu
Xifengzhen
Zhenyuan
Pingliang
Xi'an
Beijing
Tianjin
Taiyuan
Shijiazhuang
Bo Hai
Jinan
Yellow (Huang) He
Zhengzhou
Hefei
Nanjing
Shanghai
Wuhan
Hangzhou
Chang Jiang

AREA OF MAP

Project Provinces
Previous Project Provinces
Province Boundaries
International Boundaries

NOVEMBER 1991

IBRD 23348

CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
SOUTHERN PROVINCES

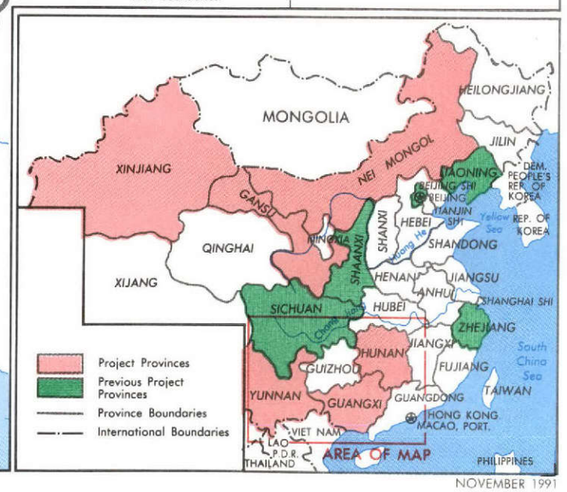
Project Counties
Prefecture Seats
Province Capitals
Prefecture Boundaries
Province Boundaries
International Boundaries

0 100 200 300
KILOMETERS

XIZANG
SICHUAN
YUNNAN
GUIZHOU
GUANGXI
HUBEI
HUNAN
JIANGXI
GUANGDONG
MYANMAR
LAO PEOPLE'S DEM. REP.
VIET NAM

Zhongdian
Lijiang
Liuku
Xiaguan
Baoshan
Weishan
Chuxiong
Kunming
Luxi
Yunxian
Lincang
Mile
Simao
Jinghong
Gejiu
Wenshan
Zhaotong
Qiaojia
Dongchuan
Qujing
Jinsha Jiang
Guiyang
Hechi
Liuzhou
Guilin
Yangshuo
Jiangyong
Jianghua
Jiahe
Chengzhou
Chenxian
Nanchang
Wuhan
Huarong
Yueyang
Nanxian
Linli
Anxiang
Sangzhi
Yongshun
Changde
Yiyang
Changsha
Zhuzhou
Xiangtan
Loudi
Xinhua
Chenxi
Jishou
Fenghuang
Huaihua
Qianyang
Shaoyang
Hengshan
Hengdong
Hengyang
Chaling
Chengbu
Lingling
Bose
Duan
Laibin
Pingguo
Longan
Nanning
Fusui
Guigang
Wuzhou
Cenxi
Yulin
Qinzhou
Hongshui He
You Jiang
Qian Jiang
Xun Jiang
Chang Jiang

This map has been prepared by The World Bank's staff exclusively for the convenience of readers and is exclusively for the internal use of the World Bank Group. The denominations used and the boundaries shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.



NOVEMBER 1991

---------- Forwarded by Helen Watkins/Person/World Bank on 07/30/99 03:12 PM ----------

ICR Review - Evaluation Summary

Operations Evaluation Department

Date Created: 07/15/99 03:27:46 PM
Last Updated: 07/30/99 02:53:47 PM
Status: Open

1. Project Data:	
OEDID:	C2336
Project Name:	Rural Water Supply and Sanitation Project
Country:	China
Sector:	Rural Water Supply & Sanitation
L/C Number:	Credit 2336-CHA
Partners involved:	
Prepared by:	Klas B. Ringskog, OEDST
Reviewed by:	Tauno K. Skytta
Group Manager:	Gregory K. Ingram
Date Posted:	8/12/99

2. Project Objectives, Financing, Costs and Components:

Objectives: The ultimate objective was to improve the health and productivity of the poorest and most needy inhabitants of rural China. The instrumental objectives were to: (a) develop long-term sectoral and sub-sectoral strategies to prioritize investments at the county level; (b) explore and develop appropriate low-cost service alternatives and make programs sustainable through community participation; (c) establish and maintain properly staffed institutions and provide technical assistance and training to support the investment programs; (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction and technical assistance and training; and (e) promote programs that would enhance community participation and replicability through standards and manuals and through disseminating the lessons learned.

Components: (a) The construction of water supply systems to serve some 9 million rural dwellers; (b) Construction of facilities of sustainable systems of sanitary excreta disposal; (c) Provision of health/hygiene education to all project counties through training and the establishment of training systems; (d) Technical assistance and training in support of an on-going UNDP-project to underpin the first three components above; and (e) Institution establishment and project management associated with the first three components above.

Costs: Actual project costs were US$167.5 million estimated as of June 30, 1998 vs. the appraisal estimate of US$189.1 million.

Financing: The costs were financed by IDA (US$84.9 million) and from domestic sources (US$82.6 million). The IDA credit was approved in FY92 and closed, fully disbursed, on December 31, 1998, one year behind schedule.

3. Achievement of Relevant Objectives:
In general, the ultimate objective to improve health and productivity of the poorest and most needy inhabitants of rural China (by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training) was achieved to a significant degree. Supervision missions revealed positive villager self-assessments of project results and reported reductions in the incidence of intestinal diseases. Out of the instrumental objectives: (a) long-term sectoral strategies to prioritize investments at the county level were developed through a targeting effort; (b) appropriate low-cost service alternatives and sustainable programs through community participation were developed in the form of design manuals; (c) institutions, technical assistance, and training to support the investment programs still await the final decision by GOC on its preferred institutional arrangements in the water sector from among three options identified; (d) coverage in water supply had risen by 8.9 million inhabitants (99% of the target) at the closing date. In contrast, the sanitation program achieved its targets only partially due to affordability concerns and farmer's strong preference to use nightsoil to fertilize crops. Similarly, the health/hygiene education campaign reached 9.4 million rural inhabitants, but the degree of modification in hygiene habits was not clear-cut; (d) The technical assistance and training was successfully carried out; and (e) Project management was in the main satisfactory.

4. Significant Achievements:
The second rural water supply and sanitation project represents a major departure from the first rural water project that invested primarily in larger water systems, that often served towns rather than villages. The second project made a very substantial, and in the end largely successful, effort to target poorer rural inhabitants. Similarly, the effort to develop and effectively implement lower-cost technologies represented a major advance over the first project.

5. Significant Shortcomings:
The original targets to increase sanitary excreta disposal were not reached pointing to the ingrained preference of farmers to use fresh nightsoil to fertilize crops.

6. Ratings:	ICR	OED Review	Reason for Disagreement/Comments
Outcome:	Satisfactory	Satisfactory	
Institutional Dev.:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	
Quality of ICR:		Satisfactory	

7. Lessons of Broad Applicability:
(a) Demand for improved latrines is correlated with higher income levels and, in this case, the income levels of the rural poor were too low to support the latrine improvement strategy; (b) Investing in model villages with external financing did not yield the desired demonstration effect in non-project villages where the same external financing was not available; and (c) Training of water plant operators and accountants is critical to ensure sustainability of the systems and financing must be provided to ensure that it will occur.

8. Audit Recommended? ○ Yes ● No

9. Comments on Quality of ICR:
The ICR provides an exhaustive description of the ambitious effort to target poorer rural inhabitants and change their hygiene and sanitary habits. Although the ERR was not calculated, the ICR presents an extensive discussion on economic aspects of the project and efficiency of its implementation.

Helen Watkins
Operations Evaluation Department
Sector and Thematic Evaluations Group
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Telephone: (202) 473-1708
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Room G-7-017

To: Gregory K. Ingram
cc: Adala T. Bruce-Konuah

ICR Review - Evaluation Summary

Operations Evaluation Department

1. Project Data:	
OEDID:	C2336
Project Name:	Rural Water Supply and Sanitation Project
Country:	China
Sector:	Rural Water Supply & Sanitation
L/C Number:	Credit 2336-CHA
Partners involved:	
Prepared by:	Klas B. Ringskog, OEDST
Reviewed by:	Tauno K. Skytta
Group Manager:	Gregory K. Ingram
Date Posted:	08/17/99

2. Project Objectives, Financing, Costs and Components:

Objectives: The ultimate objective was to improve the health and productivity of the poorest and most needy inhabitants of rural China. The instrumental objectives were to: (a) develop long-term sectoral and sub-sectoral strategies to prioritize investments at the county level; (b) explore and develop appropriate low-cost service alternatives and make programs sustainable through community participation; (c) establish and maintain properly staffed institutions and provide technical assistance and training to support the investment programs; (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction and technical assistance and training; and (e) promote programs that would enhance community participation and replicability through standards and manuals and through disseminating the lessons learned.

Components: (a) The construction of water supply systems to serve some 9 million rural dwellers; (b) Construction of facilities of sustainable systems of sanitary excreta disposal; (c) Provision of health/hygiene education to all project counties through training and the establishment of training systems; (d) Technical assistance and training in support of an on-going UNDP-project to underpin the first three components above; and (e) Institution establishment and project management associated with the first three components above.

Costs: Actual project costs were US$167.5 million estimated as of June 30, 1998 vs. the appraisal estimate of US$189.1 million.

Financing: The costs were financed by IDA (US$84.9 million) and from domestic sources (US$82.6 million). The IDA credit was approved in FY92 and closed, fully disbursed, on December 31, 1998, one year behind schedule.

3. Achievement of Relevant Objectives:

In general, the ultimate objective to improve health and productivity of the poorest and most needy inhabitants of rural China (by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training) was achieved to a significant degree. Supervision missions revealed positive villager self-assessments of project results and reported reductions in the incidence of intestinal diseases. Out of the instrumental objectives: (a) long-term sectoral strategies to prioritize investments at the county level were developed through a targeting effort; (b) appropriate low-cost service alternatives and sustainable programs through community participation were developed in the form of design manuals; (c) institutions, technical assistance, and training to support the investment programs still await the final decision by GOC on its preferred institutional arrangements in the water sector from among three options identified; (d) coverage in water supply had risen by 8.9 million inhabitants (99% of the target) at the closing date. In contrast, the sanitation program achieved its targets only partially due to affordability concerns and farmer's strong preference to use nightsoil to fertilize crops. Similarly, the health/hygiene education campaign reached 9.4 million rural inhabitants, but the degree of modification in hygiene habits was not clear-cut; (d) The technical assistance and training was successfully carried out; and (e) Project management was in the main satisfactory.

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6. Ratings:	ICR	OED Review	Reason for Disagreement/Comments
Outcome:	Satisfactory	Satisfactory	
Institutional Dev.:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	
Quality of ICR:		Satisfactory	

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Gregory K. Ingram
08/03/99 05:05 PM

Extn: 31052 OEDST

Sent by: Adala T. Bruce-Konuah

Subject: CHINA: Rural Water supply and Sanitation Project (Cr. 2336-CHA)
OED Review of Implementation Completion Report

Attached for your review is OED's Evaluation Summary for the above project. This form contains OED's ratings and comments on the ICR. Any comments you may have should reach me no later than August 9, 1999.

Gregory K. Ingram
Manager
Sector and Thematic Evaluations Group

ICR Review - Evaluation Summary

Operations Evaluation Department

Date Created: 07/15/99 03:27:46 PM
Last Updated: 07/30/99 02:53:47 PM
Status: Open

1. Project Data:	
OEDID:	C2336
Project Name:	Rural Water Supply and Sanitation Project
Country:	China
Sector:	Rural Water Supply & Sanitation
L/C Number:	Credit 2336-CHA
Partners involved:	
Prepared by:	Klas B. Ringskog, OEDST
Reviewed by:	Tauno K. Skytta
Group Manager:	Gregory K. Ingram
Date Posted:	

2. Project Objectives, Financing, Costs and Components:

Objectives: The ultimate objective was to improve the health and productivity of the poorest and most needy inhabitants of rural China. The instrumental objectives were to: (a) develop long-term sectoral and sub-sectoral strategies to prioritize investments at the county level; (b) explore and develop appropriate low-cost service alternatives and make programs sustainable through community participation; (c) establish and maintain properly staffed institutions and provide technical assistance and training to support the investment programs; (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction and technical assistance and training; and (e) promote programs that would enhance community participation and replicability through standards and manuals and through disseminating the lessons learned.

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6. Ratings:	ICR	OED Review	Reason for Disagreement/Comments
Outcome:	Satisfactory	Satisfactory	
Institutional Dev.:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	
Quality of ICR:		Satisfactory	

7. Lessons of Broad Applicability:
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To: Yukon Huang
cc: Prem C. Garg
Anthony J. Pellegrini
Dawn A. Vermilya
Sumter Lee Travers
Tauno K. Skytta
Klas B. Ringskog

THE WORLD BANK GROUP

ROUTING SLIP	DATE: July 30, 1999

NAME	ROOM. NO.
Mr. Gregory Ingram, Manager, OEDST	G7035

	URGENT		PER YOUR REQUEST
	FOR COMMENT		PER OUR CONVERSATION
	FOR ACTION		NOTE AND FILE
	FOR APPROVAL/CLEARANCE		FOR INFORMATION
	FOR SIGNATURE		PREPARE REPLY
	NOTE AND CIRCULATE		NOTE AND RETURN

RE: CHINA—Rural Water Supply and Sanitation Project (Credit 2336-CHA)
Implementation Completion Report

REMARKS:

Please find attached for panel review the above-mentioned ICR together with the Project Information Form, and a draft Evaluation Summary from the Manager, OEDST, to the Country Director concerned.

SIGN HERE

FROM	ROOM NO.	EXTENSION
Tauno Skytta		

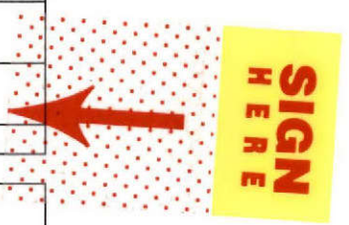
---------- Forwarded by Helen Watkins/Person/World Bank on 07/30/99 03:12 PM ----------

ICR Review - Evaluation Summary

Operations Evaluation Department

Date Created: 07/15/99 03:27:46 PM
Last Updated: 07/30/99 02:53:47 PM
Status: Open

1. Project Data:	
OEDID:	C2336
Project Name:	Rural Water Supply and Sanitation Project
Country:	China
Sector:	Rural Water Supply & Sanitation
L/C Number:	Credit 2336-CHA
Partners involved:	
Prepared by:	Klas B. Ringskog, OEDST
Reviewed by:	Tauno K. Skytta
Group Manager:	Gregory K. Ingram
Date Posted:	



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5. Significant Shortcomings:
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6. Ratings:	ICR	OED Review	Reason for Disagreement/Comments
Outcome:	Satisfactory	Satisfactory	
Institutional Dev.:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	
Quality of ICR:		Satisfactory	

7. Lessons of Broad Applicability:
(a) Demand for improved latrines is correlated with higher income levels and, in this case, the income levels of the rural poor were too low to support the latrine improvement strategy; (b) Investing in model villages with external financing did not yield the desired demonstration effect in non-project villages where the same external financing was not available; and (c) Training of water plant operators and accountants is critical to ensure sustainability of the systems and financing must be provided to ensure that it will occur.

8. Audit Recommended? ○ Yes ● No

9. Comments on Quality of ICR:
The ICR provides an exhaustive description of the ambitious effort to target poorer rural inhabitants and change their hygiene and sanitary habits. Although the ERR was not calculated, the ICR presents an extensive discussion on economic aspects of the project and efficiency of its implementation.

Helen Watkins
Operations Evaluation Department
Sector and Thematic Evaluations Group
EMail address:Hwatkins@worldbank.org
Telephone: (202) 473-1708
Fax: (202) 522-3123
Room G-7-017

To: Gregory K. Ingram
cc: Adala T. Bruce-Konuah

Helen Watkins
07/30/99 03:12 PM

Extn: 31708 OEDST ***** DRAFT *****
Subject: CHINA: Rural Water supply and Sanitation Project (Cr. 2336)
OED Review of Implementation Completion Report

This ICR has been approved by you and it is now ready to go to the Region.

To: Yukon Huang, Country Director, EACCF

Attached for your review is OED's Evaluation Summary for the above project. This form contains OED's ratings and comments on the ICR. Any comments you may have should reach me no later than August 9, 1999.

Gregory K. Ingram
Manager
Sector and Thematic Evaluations Group

cc: P. Garg (MDOQA); A. Pellegrini (TWUDR); D. Vermilya (EACCF); L. Travers (TWUWS); T. Skytta, K. Ringskog (OEDST)

This PIF has not been posted

OED ID :	C2336
Type :	ES
Country :	China
Project Description :	Rural Water Supply
Sector :	WX / Water Supply & Sanitation
Subsector :	WR / Rural Water Supply & Sanitation
Lending Instrument :	Specific Investment
L/C :	C2336

Problems

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| ERRORS |
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* These must be fixed before the PIF can be posted *

Section      Question      Error
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A1           3.9           No answer
```

Operations Evaluation Department
PROJECT INFORMATION FORM

Table of Contents

A1. General Project Information

OED ID :	C2336
Type :	ES
Country :	China
Project Description :	Rural Water Supply
Sector :	WX / Water Supply & Sanitation
Subsector :	WR / Rural Water Supply & Sanitation
Lending Instrument :	Specific Investment
L/C :	C2336

1. Reviewer: Klas Ringskog

2. Do you agree with the assigned primary Sector and Subsector? (●) Yes ( ) No

Sugg. Sector:
Sugg. Subsector:

3. Key Dates

	Original	Latest
Departure of Appraisal Mission		05/15/1991
Approval		02/11/1992
Signing/Agreement		04/10/1992
Effectiveness	07/09/1992	07/23/1992
Physical completion	12/31/1997	12/31/1998
Closing	12/31/1997	12/31/1998
ICR receipt in OED		06/29/1999
Review date		07/15/1999
ES posting or PAR approval		

4. Key Amounts ($US million)

Original Commitment	110
Total Cancellation	0
Total project cost	
Original	189.1
Latest	167.5

5. Cofinanciers

	First	Second	Third
Name	None		
Original Commitment ($US million)			
Total Cancellation ($US million)			

6. Distribution of latest cost among component types ($US million):

Physical	166.3
Technical assistance	1.2
Balance of payments	0
Line of credit	0
Other	0

7. Applicable disbursement profile (no. of years): 8.5 years/China-all secto

8. Number of supervision missions: 12

9. Name(s) of primary author(s) of ICR (indicate if not known): Ms. Dawn Vermilya and Mr. Lee Travers

10. Names of managers

	At entry	At exit
Task manager	Ivy Cheng	Dawn Vermilya
Division chief	Zafer Ecevit	Keshav Varma
Department director	Shahid Javed Burki	Yukon Huang

A2. Project Objectives Evaluation

1. Were the project objectives substantially revised during implementation? **No**

   If Yes, did the Board approve the revised objectives as part of a formal restructuring?

   Date of Board approval

Note: If objectives were substantially revised, base the ratings in sections B1 and B2 on the revised objectives.

2. Taking into account the country's level of development and the competence of the implementing agency, to what extent did the project design have the following characteristics:

Demanding on Borrower / Implementing Agency	Substantial
Complexity	Substantial
Riskiness	Modest

3. Did the project include a monitoring and evaluation system for the implementation phase? **No**

If Yes, rate the extent to which the system met each of the following five criteria for a good M&E system:

Clear project and component objectives verifiable by indicators	
A structured set of indicators	
Requirements for data collection and management	
Institutional arrangements for capacity building	
Feedback from M&E	

4. For this particular project, rate the importance of the project's objectives:

Physical	Substantial	Institutional	Substantial
Financial (interest rates; pricing / tariff policies; cost recovery	Substantial	Social	Substantial
Economic		Environmental	Substantial
Macro-economic policies (fiscal; monetary; trade)	Not Applicable	Private sector development	Not Applicable
Sector policies	Substantial	Other (specify):	

B1a. Outcomes — Relevance

1. Indicate the relevance of each of the project's objectives in terms of the Bank's / Borrower's current country or sectoral objectives:

Physical	Substantial
Financial (interest rates; pricing / tariff policies; cost recovery)	Substantial
Economic	
Macro-economic policies (fiscal; monetary; trade)	Not Applicable
Sector policies	Substantial
Institutional	Substantial
Social	Substantial
Environmental	Substantial
Private sector development	Not Applicable
Other (specify):	

2. Summary Rating of Relevance

Rate the extent to which, as a whole, the project's goals were consistent with the Bank's / Borrower's strategies, taking account of the relevance and relative importance of each of the project's objectives: Substantial

Average rating (weighted by scores on relative importance) Substantial

If your overall rating differs from the average rating, please comment on reasons for this difference:

B1b. Outcomes — Efficacy

1. Indicate the extent to which each of the following objectives was in fact accomplished:

Physical	Substantial
Financial (interest rates; pricing / tariff policies; cost recovery	Substantial
Economic	
Macro-economic policies (fiscal; monetary; trade)	Not Applicable
Sector policies	Modest
Institutional	Substantial
Social	Substantial
Environmental	Modest
Private sector development	Not Applicable
Other (specify):	

2. Summary Rating of Efficacy

Rate the efficacy of the project, taking account of the relative importance of the objectives and the extent to which they were accomplished: Substantial

Average rating (weighted by scores on relative importance) Substantial

If your overall rating differs from the average rating, please comment on reasons for this difference:

B1b. Outcomes — Efficacy (cont'd)

3. Rate the extent to which each of the following factors affected the achievement of this project's objectives:

World markets / prices	Not Applicable	Performance of contractors / consultants	Positive
Natural events	Not Applicable	War / civil disturbance	Not Applicable
Cofinancier(s) performance	Not Applicable	Other (specify):	

B1c. Outcomes — Efficiency

1. Is an **Economic Rate of Return** (ERR) available for this project? ○ Yes ◉ No

If No, is a **Financial Rate of Return** (FRR) available? ○ Yes ◉ No

If a rate of return is available, provide the following information (in percent):

		Point Value	Range	Weighted Average	Coverage / Scope
At Appraisal	◉ Not Available ○ Not Applicable		From : To :		
At Completion	◉ Not Available ○ Not Applicable		From : To :		

2. Was another measure of efficiency provided? ○ Yes ◉ No

If Yes, then answer the following:

Measure used

Coverage / scope of measure

Comparison to appraisal estimate

3. If no measure of efficiency was provided for this project, would it have been reasonable to expect one? ○ Yes ◉ No

If Yes, explain:

4. Rate the quality of the ex-post economic analysis according to the following criteria:

Soundness of analysis

Conduct of sensitivity / risk analysis

Consideration of institutional constraints to achieving results

Extent to which benefits accrue to target population

Consideration of environmental externalities

Consideration of fiscal impact

Consideration of alternatives to meeting objectives

Overall rating of quality of analysis

Average rating

If your overall rating differs from the average rating, please comment on reasons for this difference:

B1c. Outcomes — Efficiency (cont'd)

5. Summary Rating of Efficiency

Rate overall to what extent the project accomplished its goals efficiently:	Substantial	If your overall rating differs from the average rating, please comment on reasons for this difference:
Average rating		The project implemented the schemes within its scope in poorer Districts of China and within the targeted villages aimed at improving WS&S of the poorer segment of the population. Judging on the evidence as per ICR this was done efficiently.

B1d. Outcomes — Summary

1. SUMMARY OUTCOME RATING

Rate the project's outcome (i.e., the extent to which it achieved relevant objectives), taking account of its relevance, efficacy, and efficiency:	Satisfactory
Average rating	Satisfactory
If your overall rating differs from the average rating, please comment on reasons for this difference:	

B2. Sustainability

1. Rate the project's sustainability in terms of the following:

Technical viability	Positive	Policy environment	Positive
Financial viability	Positive	Institution / management effectiveness	Positive
Economic viability	Not Applicable	Local participation	Positive
Social conditions	Positive	Other (specify):	
Environmental concerns	Positive		
Government commitment	Positive		

2. SUMMARY SUSTAINABILITY RATING

Rate the probability of maintaining the project's relevant development achievements generated or expected to be generated:	Likely
Average rating	Likely
If your overall rating differs from the average rating, please comment on reasons for this difference:	

B3. Institutional Development

1. Was this project directed primarily toward Institutional Development? ○ Yes ◉ No

2. If not, did the project contain components with significant Institutional Development objectives? ◉ Yes ○ No

3. Did the project's Institutional Development activities include each of the following:

Establishment of a new organization	Not Applicable
Elimination of an existing organization	Not Applicable
Restructuring / privatizing of an organization	Yes

4. For this particular project, rate the relevance of the following Institutional Development objectives:

National capacity	
Economic management	Not Applicable
Civil service reform	Not Applicable
Financial intermediation	Not Applicable
Legal / regulatory system	Not Applicable
Sectoral capacity	Substantial
Other (specify):	
Agency capacity	
Planning / policy analysis	High
Management	Substantial
Skills upgrading	Substantial
MIS	Substantial
Other (specify):	
NGO Capacity	Substantial

5. For this project, rate the extent to which each of the following ID objectives was achieved:

National capacity	
Economic management	Not Applicable
Civil service reform	Not Applicable
Financial intermediation	Not Applicable
Legal / regulatory system	Not Applicable
Sectoral capacity	Substantial
Other (specify):	
Agency capacity	
Planning / policy analysis	Substantial
Management	Substantial
Skills upgrading	Substantial
MIS	Substantial
Other (specify):	
NGO Capacity	Modest
Overall ID Efficacy	Substantial

6. SUMMARY INSTITUTIONAL DEVELOPMENT IMPACT RATING

Rate the extent to which, as a whole, the project resulted in improvement of the country's/sector's ability to effectively use its human, organizational, and financial resources: Substantial

Average rating: Substantial

If your overall rating differs from the average rating, please comment on reasons for this difference:

C1. Bank Performance

1. To what extent did each of the following apply during project identification / preparation:

Involvement of government	Substantial
Involvement of beneficiaries	Substantial
Project consistency with Bank strategy for country	Substantial
Grounding in economic and sector work (ESW)	Substantial
Other (specify):	

Overall rating on identification / preparation: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

2. Indicate how well the Bank took account of the following during project appraisal:

Technical analysis (inc. alternatives)	Substantial
Financial analysis (inc. funding provisions, fiscal impact)	Substantial
Cost-benefit analysis (incl.ERR)	Substantial
Institutional capacity analysis	Substantial
Social and stakeholder analysis	Substantial
Environmental analysis	Substantial
Risk assessment (inc. adequacy of conditionalities)	Substantial
Incorporation of M&E indicators	Substantial
Incorporation of lessons learned	Substantial
Readiness for implementation	Substantial
Suitability of lending instrument	Substantial

Overall rating on appraisal: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

3. Considering the identification / preparation and appraisal processes discussed above, rate the overall quality of the project at the time of Board approval (Quality at Entry): Satisfactory

4. Indicate the adequacy of Bank project supervision in the following areas:

Reporting on project implementation progress	Substantial
Identification / assessment of implementation problems	Substantial
Use of performance indicators	Substantial
Enforcement of Borrower provision of M&E data	Substantial
Advice to implementing agency	Substantial
Enforcement of loan covenants / exercise of remedies	Substantial
Flexibility in suggesting / approving modifications	Substantial
Other (specify):	

Overall rating on supervision: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

C1. Bank Performance (cont'd)

5. SUMMARY RATING OF BANK PERFORMANCE

Rate the Bank's overall performance, taking account of identification / preparation, appraisal, and supervision activities:	Satisfactory
Average rating	Satisfactory
If your overall rating differs from the average rating, please comment on reasons for this difference:	

C2. Borrower Performance

1. Rate the Borrower / Implementing Agency performance on the preparation of this project: Satisfactory

2. Rate the extent to which government / implementing agency performance on the following dimensions supported project implementation:

Dimensions generally subject to government control

Macro policies / conditions	Not Applicable	Administrative procedures	Substantial
Sector policies / conditions	Substantial	Cost changes	Substantial
Government commitment	Substantial	Implementation delays	Substantial
Appointment of key staff	Substantial	Other (specify):	
Counterpart funding	Substantial		

Dimensions generally subject to implementing agency control

Management	Substantial	Use of technical assistance	Substantial
Staffing	Substantial	Beneficiary participation	Substantial
Cost changes	Substantial	Other (specify):	
Implementation delays	Substantial		

C2. Borrower Performance (cont'd)

3. Summary Rating of Borrower Performance on Project Implementation

Overall rating: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

4. Rate Borrower compliance with loan covenants / commitments:

Satisfactory

5. SUMMARY RATING OF BORROWER PERFORMANCE

Overall rating: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

D. Special Themes

1. Indicate whether each of the following social concerns was a major project emphasis:

Gender related issues	No
Settlement / resettlement	No
Beneficiary participation	Yes
Community development	Yes
Skills development	Yes
Nutrition and food security	No
Health improvement	Yes
Other (specify):	

2. Did the project have an unintended or unexpected effect on social concerns, regardless of the project's objectives?

No

If Yes, was the effect positive or negative?

3. Was this a Poverty Targeted Intervention? (●) Yes ( ) No

Did the project place a major emphasis on poverty alleviation? (●) Yes ( ) No

If Yes:

Did it emphasize broad-based growth with labor absorption? ( ) Yes (●) No

Did it emphasize human development (education, health, or nutrition)? (●) Yes ( ) No

Did it emphasize the provision of a social safety net? ( ) Yes (●) No

4. Indicate whether each of the following environmental concerns was a major project emphasis:

Natural resource management	Yes
Air / water / soil quality	Yes
Urban environmental quality	Not Applicable
Other (specify):	

D. Special Themes (cont'd)

5. Did the project have an unintended or unexpected effect on environmental concerns, regardless of the project's objectives?

No

If Yes, was the effect positive or negative?

7. Rate the priority of the project for audit

Low

8. Rate the priority of the project for impact evaluation

Low

6. Indicate whether each of the following private sector development (PSD) concerns was a major project emphasis:

Improvement in legal or incentive framework designed to foster PSD (e.g., trade, pricing)	No
Restructuring / privatization of public enterprises	No
Financial sector development	No
Direct government financial and / or technical assistance to the private sector	No
Other (specify):	

E. Rating of ICR

1. Rate the quality of the ICR by the following characteristics:

Analysis	
Coverage of important subjects	Satisfactory
Ex-post economic analysis	Not Available
Soundness of analysis	
Internal consistencies	Satisfactory
Evidence complete / convincing	Satisfactory
Adequacy of lessons learned	Satisfactory
Aide-memoire of the ICR mission	Satisfactory

Future operation of project	
Plan for future project operation	Satisfactory
Performance indicators for the project's operational phase	Satisfactory
Plan for monitoring and evaluation of future operation of the project	Satisfactory
Borrower / cofinancier inputs	
Borrower input to ICR	Satisfactory
Borrower plan for future project operation	Exemplary
Borrower comments on ICR	Satisfactory
Cofinancier comments on ICR	Not Applicable

2. SUMMARY RATING OF ICR

Rate the quality of the ICR:	Satisfactory
Average rating	Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

E. Rating of ICR (cont'd)

3. Rate the quality of borrower participation in the project completion process on the following:

Analysis	Satisfactory	Focus on lessons learned	Satisfactory
Concern with development impact	Satisfactory	Self-evaluation	Satisfactory
Internal consistency	Satisfactory	Evaluation of Bank	Satisfactory
Evidence to justify views	Satisfactory		

F. Summary of Ratings

1. SUMMARY OF RATINGS

	ICR	ES
Outcome	Satisfactory	Satisfactory
Sustainability	Likely	Likely
Institutional Development efficacy / impact	Substantial	Substantial
Bank performance	Satisfactory	Satisfactory
Borrower performance	Satisfactory	Satisfactory
ICR quality		Satisfactory

2. Explain any differences between OED ratings and those in the ICR:

G. Overall Judgements / Miscellaneous Comments

1. Enter any overall judgements or rationales and miscellaneous comments below.

Project	Project Type	Loan Credit
300	**ICR**	CR 2336

Country

CHINA - Rural Water Supply and Sanitation Project

Prepared by

K. RINGSKOG

Date Received by Panel

7/19/99

Assigned to

SKYTTA

Date Assigned

7/20/99

Review Completed

7/30/99

Comments

Upon completing your review, please return the package to Nishi (Room G7 155) for logging and forwarding to the corresponding task manager. The originating task manager would be expected to resubmit the final package for your initials within the prescribed 7 working days from this date.

THE WORLD BANK GROUP

ROUTING SLIP	DATE: July 19, 1999

NAME	ROOM. NO.
Mr. Hernan Levy, Audit Review Panel	G7033

	URGENT		PER YOUR REQUEST
	FOR COMMENT		PER OUR CONVERSATION
	FOR ACTION		NOTE AND FILE
	FOR APPROVAL/CLEARANCE		FOR INFORMATION
	FOR SIGNATURE		PREPARE REPLY
	NOTE AND CIRCULATE		NOTE AND RETURN

RE: CHINA: Rural Water supply and Sanitation Project (Credit 2336-CHA) Implementation Completion Report

REMARKS:

Please find attached for panel review the above-mentioned ICR together with the Project Information Form, and a draft Evaluation Summary from the Manager, OEDST, to the Country Director concerned.

FROM	ROOM NO.	EXTENSION
Klas Ringskog, Task Manager HLL for KRingskog	**G7011**	**37595**

ICR Review - Evaluation Summary

Operations Evaluation Department

Date Created: 07/15/99 03:27:46 PM
Last Updated: 07/15/99 09:55:26 PM
Status: Open

1. Project Data:	
OEDID:	C2336
Project Name:	Rural Water Supply and Sanitation Project
Country:	China
Sector:	Rural Water Supply & Sanitation
L/C Number:	Credit 2336-CHA
Partners involved:	
Prepared by:	Klas B. Ringskog, OEDST
Reviewed by:	Tamas K. Sky Hb
Group Manager:	Gregory K. Ingram
Date Posted:	

2. Project Objectives, Financing, Costs and Components:

Objectives: The ultimate objective was to improve the health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training. The instrumental objectives were to: (a) develop long-term sectoral and sub-sectoral strategies to prioritize investments at the county level; (b) explore and develop appropriate low-cost service alternatives and make programs sustainable through community participation; (c) establish and maintain properly staffed institutions and provide technical assistance and training to support the investment programs; (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction and technical assistance and training; and (e) promote programs that would enhance community participation and replicability through standards and manuals and through disseminating the lessons learned.

Components: (a) The construction of water supply systems to serve some 9 million rural dwellers; (b) Construction of facilities of sustainable systems of sanitary excreta disposal; (c) Provision of health/hygiene education to all project counties through training and the establishment of training systems; (d) Technical assistance and training in support of an on-going UNDP-project to underpin the first three components above ; and (e) Institution establishment and project management associated with the first three components above.

Costs: Actual project costs were US$ 167.5 million estimated as of June 30, 1998 vs. the appraisal estimate of US$ 189.1 million.

Financing: Actual project costs were financed by IDA (US$ 84.9 million) and from domestic sources (US$ 82.6 million). The IDA credit closed on , one year behind schedule, fully disbursed.

done!
7/30-99
B

3. Achievement of Relevant Objectives:
The Project achievements should be measured against the original objectives as stated in the SAR. In this vein, the ultimate objective to improve health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training was likely achieved to a significant degree but the absence of a formal monitoring program makes it impossible to state by how much. IDA supervision missions revealed positive beneficiary villager self-assessments of project results and reductions in the incidence of intestinal diseases were reported. The ICR does not document the achievements among the poorest and most needy rural inhabitants although it is reported that the very poorest villages were excluded for their inability to generate sufficient cash. Out of the instrumental objectives (a) long-term sectoral and sub-sectoral strategies to prioritize investments at the county level were undoubtedly developed through a targeting effort; (b) appropriate low-cost service alternatives and sustainable programs through community participation were developed in the form of design manuals; (c) institutions and provide technical assistance and training to support the investment programs still await the final decision by the Government of China on its preferred institutional arrangements in the water sector from among three options identified; (d) coverage in water supply had risen by 8.9 million inhabitants (99% of the 9.0 million target) at the closing date. In contrast, the sanitation program achieved its targets only partially because of affordability concerns and the population's strong preference to use fresh nightsoil to fertilize crops. Similarly, the impressive health/hygiene education campaign reached 9.4 million rural inhabitants but the degree of modification in hygiene habits was not clear-cut; (d) The technical assistance and training in support of an on-going UNDP-project to underpin the first three components above was successfully carried out; and (e) The final decision on the institutions is pending whereas project management associated with the first three components was in the main satisfactory.

4. Significant Achievements:
The second rural water supply and sanitation project represents a major departure from the first rural water project that invested primarily in larger water systems, that often served towns rather than villages. The second project made a very substantial, and in the end largely successful, effort to target poorer rural inhabitants. Similarly, the effort to develop and effectively implement lower-cost technologies represented a major advance over the first project.

5. Significant Shortcomings:
The original targets to increase sanitary excreta disposal were not reached pointing to the ingrained preference of farmers to use fresh nightsoil to fertilize crops.

6. Ratings:	ICR	OED Review	Reason for Disagreement/Comments
Outcome:	Satisfactory	Satisfactory	
Institutional Dev.:	Substantial	Substantial	
Sustainability:	Likely	Likely	
Bank Performance:	Satisfactory	Satisfactory	
Borrower Perf.:	Satisfactory	Satisfactory	
Quality of ICR:		Satisfactory	

7. Lessons of Broad Applicability:
(a) Demand for improved latrines is correlated with higher income levels and the income levels of the rural poor were too low to support the latrine improvement strategy; (b) Investing in model villages with external financing did not yield the desired demonstration effect in non-project villages where the same external financing was not available; and (c) Training of water plant operators and accountants is critical to ensure sustainability of the systems and financing must be provided to ensure that it will occur.

8. Audit Recommended? ○ Yes ● No

9. Comments on Quality of ICR:
The ICR provides an exhaustive description of the ambitious effort to target poorer rural inhabitants and change their hygiene and sanitary habits.

This PIF has not been posted

OED ID :	C2336
Type :	ES
Country :	China
Project Description :	Rural Water Supply
Sector :	WX / Water Supply & Sanitation
Subsector :	WR / Rural Water Supply & Sanitation
Lending Instrument :	Specific Investment
L/C :	C2336

done!
7/28-99
B

A1. General Project Information

OED ID :	C2336
Type :	ES
Country :	China
Project Description :	Rural Water Supply
Sector :	WX / Water Supply & Sanitation
Subsector :	WR / Rural Water Supply & Sanitation
Lending Instrument :	Specific Investment
L/C :	C2336

1. Reviewer: Klas Ringskog

2. Do you agree with the assigned primary Sector and Subsector? (●) Yes ( ) No

Sugg. Sector:
Sugg. Subsector:

3. Key Dates

	Original	Latest
Departure of Appraisal Mission		05/15/1991
Approval		02/11/1992
Signing/Agreement		04/10/1992
Effectiveness	07/09/1992	07/23/1992
Physical completion	12/31/1997	12/31/1998
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ICR receipt in OED		06/29/1999
Review date		07/15/1999
ES posting or PAR approval		

4. Key Amounts ($US million)

Original Commitment	10
Total Cancellation	0
Total project cost	
Original	189.1
Latest	167.5

5. Cofinanciers

	First	Second	Third
Name	None		
Original Commitment ($US million)			
Total Cancellation ($US million)			

6. Distribution of latest cost among component types ($US million):

Physical	166.3
Technical assistance	1.2
Balance of payments	
Line of credit	
Other	0

7. Applicable disbursement profile (no. of years): 8.5 years / China – all sectors

8. Number of supervision missions: 12

9. Name(s) of primary author(s) of ICR (indicate if not known):
Ms. Dawn Vermilya and Mr. Lee Travers

10. Names of managers

	At entry	At exit
Task manager	Ivy Cheng	Dawn Vermilya ✓
Division chief	Zafer Ecevit	Keshav Varma
Department director	Shahid Javed Burki	Yukon Huang ✓

A2. Project Objectives Evaluation

1. Were the project objectives substantially revised during implementation? No

   If Yes, did the Board approve the revised objectives as part of a formal restructuring?

   Date of Board approval

Note: If objectives were substantially revised, base the ratings in sections B1 and B2 on the revised objectives.

2. Taking into account the country's level of development and the competence of the implementing agency, to what extent did the project design have the following characteristics:

Demanding on Borrower / Implementing Agency	Substantial
Complexity	Substantial
Riskiness	Modest

3. Did the project include a monitoring and evaluation system for the implementation phase? No

If Yes, rate the extent to which the system met each of the following five criteria for a good M&E system:

Clear project and component objectives verifiable by indicators	
A structured set of indicators	
Requirements for data collection and management	
Institutional arrangements for capacity building	
Feedback from M&E	

4. For this particular project, rate the importance of the project's objectives:

Physical	Substantial	Institutional	Substantial
Financial (interest rates; pricing / tariff policies; cost recovery		Social	Substantial
Economic		Environmental	
Macro-economic policies (fiscal; monetary; trade)		Private sector development	
Sector policies		Other (specify):	

B1a. Outcomes — Relevance

1. Indicate the relevance of each of the project's objectives in terms of the Bank's / Borrower's current country or sectoral objectives:

Physical	Substantial
Financial (interest rates; pricing / tariff policies; cost recovery)	
Economic	
Macro-economic policies (fiscal; monetary; trade)	
Sector policies	
Institutional	Substantial
Social	Substantial
Environmental	
Private sector development	
Other (specify):	

2. Summary Rating of Relevance

Rate the extent to which, as a whole, the project's goals were consistent with the Bank's / Borrower's strategies, taking account of the relevance and relative importance of each of the project's objectives: Substantial

Average rating (weighted by scores on relative importance) Substantial

If your overall rating differs from the average rating, please comment on reasons for this difference:

B1b. Outcomes — Efficacy

1. Indicate the extent to which each of the following objectives was in fact accomplished:

Physical	Substantial
Financial (interest rates; pricing / tariff policies; cost recovery	Substantial
Economic	
Macro-economic policies (fiscal; monetary; trade)	
Sector policies	
Institutional	Substantial
Social	Substantial
Environmental	
Private sector development	
Other (specify):	

2. Summary Rating of Efficacy

Rate the efficacy of the project, taking account of the relative importance of the objectives and the extent to which they were accomplished: Substantial

Average rating (weighted by scores on relative importance) Substantial

If your overall rating differs from the average rating, please comment on reasons for this difference:

B1b. Outcomes — Efficacy (cont'd)

3. Rate the extent to which each of the following factors affected the achievement of this project's objectives:

World markets / prices		Performance of contractors / consultants	
Natural events		War / civil disturbance	
Cofinancier(s) performance		Other (specify):	

B1c. Outcomes — Efficiency

1. Is an Economic Rate of Return (ERR) available for this project? ○ Yes ◉ No

If No, is a **Financial Rate of Return** (FRR) available? ○ Yes ◉ No

If a rate of return is available, provide the following information (in percent):

		Point Value	Range	Weighted Average	Coverage / Scope
At Appraisal	◉ Not Available ○ Not Applicable		From : To :		
At Completion	◉ Not Available ○ Not Applicable		From : To :		

2. Was another measure of efficiency provided? ○ Yes ◉ No

If Yes, then answer the following:

Measure used

Coverage / scope of measure

Comparison to appraisal estimate

3. If no measure of efficiency was provided for this project, would it have been reasonable to expect one? ○ Yes ◉ No

If Yes, explain:

4. Rate the quality of the ex-post economic analysis according to the following criteria:

Soundness of analysis

Conduct of sensitivity / risk analysis

Consideration of institutional constraints to achieving results

Extent to which benefits accrue to target population

Consideration of environmental externalities

Consideration of fiscal impact

Consideration of alternatives to meeting objectives

Overall rating of quality of analysis

Average rating

If your overall rating differs from the average rating, please comment on reasons for this difference:

B1c. Outcomes — Efficiency (cont'd)

5. Summary Rating of Efficiency

Rate overall to what extent the project accomplished its goals efficiently:	Substantial	If your overall rating differs from the average rating, please comment on reasons for this difference:
Average rating		

B1d. Outcomes — Summary

1. SUMMARY OUTCOME RATING

Rate the project's outcome (i.e., the extent to which it achieved relevant objectives), taking account of its relevance, efficacy, and efficiency:	Satisfactory
Average rating	Satisfactory
If your overall rating differs from the average rating, please comment on reasons for this difference:	

B2. Sustainability

1. Rate the project's sustainability in terms of the following:

Technical viability	Positive	Policy environment	
Financial viability	Positive	Institution / management effectiveness	Positive
Economic viability		Local participation	Positive
Social conditions	Positive	Other (specify):	
Environmental concerns			
Government commitment			

2. SUMMARY SUSTAINABILITY RATING

Rate the probability of maintaining the project's relevant development achievements generated or expected to be generated:	Likely
Average rating	Likely
If your overall rating differs from the average rating, please comment on reasons for this difference:	

B3. Institutional Development

1. Was this project directed primarily toward Institutional Development? ○ Yes ◉ No

2. If not, did the project contain components with significant Institutional Development objectives? ◉ Yes ○ No

3. Did the project's Institutional Development activities include each of the following:

Establishment of a new organization	
Elimination of an existing organization	
Restructuring / privatizing of an organization	

4. For this particular project, rate the relevance of the following Institutional Development objectives:

National capacity	
Economic management	
Civil service reform	
Financial intermediation	
Legal / regulatory system	
Sectoral capacity	
Other (specify):	
Agency capacity	
Planning / policy analysis	High
Management	
Skills upgrading	
MIS	
Other (specify):	
NGO Capacity	

5. For this project, rate the extent to which each of the following ID objectives was achieved:

National capacity	
Economic management	
Civil service reform	
Financial intermediation	
Legal / regulatory system	
Sectoral capacity	
Other (specify):	
Agency capacity	
Planning / policy analysis	High
Management	
Skills upgrading	
MIS	
Other (specify):	
NGO Capacity	
Overall ID Efficacy	Substantial

6. SUMMARY INSTITUTIONAL DEVELOPMENT IMPACT RATING

Rate the extent to which, as a whole, the project resulted in improvement of the country's/sector's ability to effectively use its human, organizational, and financial resources: High

Average rating: High

If your overall rating differs from the average rating, please comment on reasons for this difference:

C1. Bank Performance

1. To what extent did each of the following apply during project identification / preparation:

Involvement of government	Substantial
Involvement of beneficiaries	Substantial
Project consistency with Bank strategy for country	
Grounding in economic and sector work (ESW)	
Other (specify):	

Overall rating on identification / preparation: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

2. Indicate how well the Bank took account of the following during project appraisal:

Technical analysis (inc. alternatives)	Substantial
Financial analysis (inc. funding provisions, fiscal impact)	
Cost-benefit analysis (incl.ERR)	
Institutional capacity analysis	
Social and stakeholder analysis	Substantial
Environmental analysis	
Risk assessment (inc. adequacy of conditionalities)	
Incorporation of M&E indicators	
Incorporation of lessons learned	
Readiness for implementation	
Suitability of lending instrument	

Overall rating on appraisal: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

3. Considering the identification / preparation and appraisal processes discussed above, rate the overall quality of the project at the time of Board approval (Quality at Entry):

4. Indicate the adequacy of Bank project supervision in the following areas:

Reporting on project implementation progress	Substantial
Identification / assessment of implementation problems	
Use of performance indicators	
Enforcement of Borrower provision of M&E data	
Advice to implementing agency	
Enforcement of loan covenants / exercise of remedies	
Flexibility in suggesting / approving modifications	
Other (specify):	

Overall rating on supervision: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

C1. Bank Performance (cont'd)

5. SUMMARY RATING OF BANK PERFORMANCE

Rate the Bank's overall performance, taking account of identification / preparation, appraisal, and supervision activities:	Satisfactory
Average rating	Satisfactory
If your overall rating differs from the average rating, please comment on reasons for this difference:	

C2. Borrower Performance

1. Rate the Borrower / Implementing Agency performance on the preparation of this project: Satisfactory

2. Rate the extent to which government / implementing agency performance on the following dimensions supported project implementation:

Dimensions generally subject to government control

Macro policies / conditions		Administrative procedures	
Sector policies / conditions		Cost changes	
Government commitment	Substantial	Implementation delays	
Appointment of key staff		Other (specify):	
Counterpart funding			

Dimensions generally subject to implementing agency control

Management		Use of technical assistance	
Staffing		Beneficiary participation	Substantial
Cost changes		Other (specify):	
Implementation delays			

C2. Borrower Performance (cont'd)

3. Summary Rating of Borrower Performance on Project Implementation

Overall rating: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

4. Rate Borrower compliance with loan covenants / commitments:

Satisfactory

5. SUMMARY RATING OF BORROWER PERFORMANCE

Overall rating: Satisfactory

Average rating: Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

D. Special Themes

1. Indicate whether each of the following social concerns was a major project emphasis:

Gender related issues	
Settlement / resettlement	
Beneficiary participation	Yes
Community development	Yes
Skills development	
Nutrition and food security	
Health improvement	Yes
Other (specify):	

2. Did the project have an unintended or unexpected effect on social concerns, regardless of the project's objectives?

If Yes, was the effect positive or negative?

3. Was this a Poverty Targeted Intervention? (●) Yes ( ) No

Did the project place a major emphasis on poverty alleviation? (●) Yes ( ) No

If Yes:

Did it emphasize broad-based growth with labor absorption? ( ) Yes ( ) No

Did it emphasize human development (education, health, or nutrition)? (●) Yes ( ) No

Did it emphasize the provision of a social safety net? ( ) Yes ( ) No

4. Indicate whether each of the following environmental concerns was a major project emphasis:

Natural resource management	
Air / water / soil quality	
Urban environmental quality	
Other (specify):	

D. Special Themes (cont'd)

5. Did the project have an unintended or unexpected effect on environmental concerns, regardless of the project's objectives?

If Yes, was the effect positive or negative?

7. Rate the priority of the project for audit

Low

8. Rate the priority of the project for impact evaluation

Low

6. Indicate whether each of the following private sector development (PSD) concerns was a major project emphasis:

Improvement in legal or incentive framework designed to foster PSD (e.g., trade, pricing)	
Restructuring / privatization of public enterprises	
Financial sector development	
Direct government financial and / or technical assistance to the private sector	
Other (specify):	

E. Rating of ICR

1. Rate the quality of the ICR by the following characteristics:

Analysis	
Coverage of important subjects	Satisfactory
Ex-post economic analysis	
Soundness of analysis	
Internal consistencies	
Evidence complete / convincing	
Adequacy of lessons learned	
Aide-memoire of the ICR mission	

Future operation of project	
Plan for future project operation	Satisfactory
Performance indicators for the project's operational phase	
Plan for monitoring and evaluation of future operation of the project	
Borrower / cofinancier inputs	
Borrower input to ICR	Satisfactory
Borrower plan for future project operation	
Borrower comments on ICR	Satisfactory
Cofinancier comments on ICR	

2. SUMMARY RATING OF ICR

Rate the quality of the ICR:	Satisfactory
Average rating	Satisfactory

If your overall rating differs from the average rating, please comment on reasons for this difference:

X@PJL SET PAGEPROTECT=OFF
@PJL SET RESOLUTION=600
@PJL ENTER LANGUAGE=PCL

E. Rating of ICR (cont'd)

3. Rate the quality of borrower participation in the project completion process on the following:

Analysis		Focus on lessons learned
Concern with development impact	Satisfactory	Self-evaluation
Internal consistency		Evaluation of Bank
Evidence to justify views		

F. Summary of Ratings

1. SUMMARY OF RATINGS

	ICR	ES
Outcome	Satisfactory	Satisfactory
Sustainability	Likely	Likely
Institutional Development efficacy / impact	~~High~~ Substantial	~~High~~ Substantial
Bank performance	Satisfactory	Satisfactory
Borrower performance	Satisfactory	Satisfactory
ICR quality		Satisfactory

2. Explain any differences between OED ratings and those in the ICR:

G. Overall Judgements / Miscellaneous Comments

1. Enter any overall judgements or rationales and miscellaneous comments below.

ICR/PIF COVER SHEET Run Date: 6/29/99

OED ID: C2336 Unit: 10

Country:	China	
Project Description:	Rural Water Supply	
Sector:	13 / Water & Sanit.	
Subsector:	13.04 / Rural Water	
Lending Instrument Type:	SIL	
L/C:	C2336	
Original IDA/IBRD Commitments:	110,000,000	($US)
Total Cancellations:	0	($US)

Key Dates	ORIGINAL	ACTUAL
Approval		2/11/92
Signing/Agreement		4/10/92
Effectiveness	7/09/92	7/23/92
Closing	12/31/97	12/31/98
ICR Receipt in OED		6/29/99

EVALUATOR NAME: Ringschog

EVALUATOR SIGNATURE: _____ DATE: July 12, 1999

Please confirm the above information, sign and date this sheet and return a phot to Helen Sioris when the EVM/Regional memo/PIF packet is submitted to OED Direct

********** TO BE COMPLETED BY EVALUATION OFFICER **********

Date of Review: 7 / 15 / 99 (mm / dd / yy)

Name of Reviewer: Ringschog / SkyHu (7/28-99)

Type of Evaluation: ~~PCR~~ ICR Review [V] PAR Review [ ]

If this is a PAR Review, are there major differences in the judgements from those made in the PCR Review?

Yes [ ] No [ ]

If Yes, please discuss in detail on page 26 of the PIF

	ORIGINAL	LATEST
Date of Physical Completion	12 31 97 (mm/dd/yy)	12 31 98 (mm/dd/yy)
Total Project Cost ($US mill)	189.1	167.5
Applicable Disbursement Profile: (see note 11 in the PIF, page 31)	8.5 years/China-all sectors	
Number of Supervision Missions:	12	

THE WORLD BANK GROUP

ROUTING SLIP	DATE: June 29, 1999

NAME	ROOM. NO.
Ms. H. Sioris, OED	G6-068

	URGENT		PER YOUR REQUEST
	FOR COMMENT		PER OUR CONVERSATION
	FOR ACTION		NOTE AND FILE
	FOR APPROVAL/CLEARANCE,	✠	FOR INFORMATION
	FOR SIGNATURE		PREPARE REPLY
	NOTE AND CIRCULATE		NOTE AND RETURN

RE: CHINA - IMPLEMENTATION COMPLETION REPORT - RURAL WATER SUPPLY & SANITATION PROJECT (CR. 2336-CHA)

REMARKS: Are you still accepting ICRs on behalf of OED? If not, we would appreciate your passing it on to the right person. Many thanks.

FROM	ROOM NO.	EXTENSION
Lee Travers	**F4K-22**	**84076**

Report No. 19475

IMPLEMENTATION COMPLETION REPORT

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

June 29, 1999

Urban Development Sector Unit
China Country Management Unit
East Asia and Pacific Regional Office

CURRENCY EQUIVALENTS

(As of May 1991)

Currency: Renminbi
Currency Unit: Yuan (Y)
Y 1.00=100 fen
$1.00=Y 5.31

FISCAL YEAR

January 1 - December 31

WEIGHTS AND MEASURES

Meter (m)	= 0.62 miles
Liter (l)	= 0.264 US gallons
lpcd	= liters per capita per day
Cubic meter or ton of water	= 284 US gallons

ABBREVIATIONS AND ACRONYMS

CPO	=	County Project Office
ICB	=	International Competitive Bidding
O&M	=	Operations and Maintenance
MOF	=	Ministry of Finance
NPHCC	=	National Patriotic Health Campaign Committee
NPO	=	National Project Office
PPO	=	Provincial Project Office
RWSS	=	Rural Water Supply and Sanitation Project
UNDP	=	United Nations Development Program
UNDB/WB	=	UNDB/World Bank Water and Sanitation Program
WHO	=	World Health Organization
Gansu	=	Gansu Province
Guangxi	=	Guangxi Zhuang Autonomous Province
Hunan	=	Hunan Province
Inner Mongolia	=	Inner Mongolia Autonomous Region
Xinjiang	=	Xinjiang Uygur Autonomous Region
Yunnan	=	Yunnan Province

Vice President	:	Jean-Michel Severino, EAPVP
Country Director	:	Yukon Huang, EACCF
Sector Manager	:	Keshav Varma, EASUR
Task Manager	:	Dawn Vermilya, EACCF

CONTENTS

IMPLEMENTATION COMPLETION REPORT

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

PREFACE

This is the Implementation Completion Report (ICR) for the Rural Water Supply and Sanitation Project in China, for which Credit 2336-CHA in the amount of SDR 78.9 million (US$110.0 million equivalent) were approved on April 10, 1992 and made effective on July 23, 1992.

The credit was closed on December 31, 1998. The Credit was fully disbursed and the last disbursement took place on May 24, 1999, with the Special Account recovery.

The ICR was prepared by Ms. Dawn Vermilya (Task Manager and Financial Analyst—EACCF) and Lee Travers (Economist and former Task Manager—TWUWS), with contributions from George Plant (Water/Sanitation Engineer—EACCF), Dr. Huang Ping (Sociologist—Consultant), and Li Xiaofeng (Task Team Assistant) and reviewed by Messrs. Keshav Varma, Sector Manager, EASUR and Yukon Huang, Country Director, China. The Borrower provided comments that are included as an appendix to the ICR.

Preparation of this ICR was begun during IDA's final supervision/completion mission, from November 23 to December 4, 1998. It is based on material in the project file. The borrower contributed to preparation of the ICR by the National Project Office contributing summary data, views reflected in the mission's aide-memoire, and their own evaluation of the project's execution.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

EVALUATION SUMMARY

Introduction

1. The Rural Water Supply and Sanitation Project was designed to supply about 9 million rural inhabitants in 75 counties in the provinces and autonomous regions of Guangxi, Yunnan, Hunan, Gansu, Inner Mongolia and Xinjiang with safe drinking water, health/hygiene education, and access to improved sanitation technologies. The project supplemented the national rural water supply program's efforts to meet their 1995 target to supply 85 percent of the rural population with improved water supply, including 30 to 40 percent served by piped systems and 35 to 50 percent meeting water quality standards. As of 1997, 89 percent of China's rural population had access to improved water supply, of which 48 percent was being served by piped water and almost all piped water systems meet the government's standards for safe water quality. This project is the second in a series of four rural water supply and sanitation projects that have been negotiated with China, which address raising the quality of rural drinking water to meet national standards and improving the health and hygiene conditions in rural China.

Project Objectives

2. The overall project objective was to improve the health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training. Supporting project objectives were to: (a) develop sectoral strategies to prioritize investments at the county level, (b) use community participation to maximize project impact, (c) maintain properly staffed institutions to support adoption, implementation and operation of investment programs, (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction, provision of equipment and utility vehicles, technical assistance and training; and, (e) establish ongoing and expanding programs and enhance community participation and replicability through provision of appropriate models, development and distribution of standards and manuals.

3. The project components in brief were:

- **Water Supply.** Construction of facilities such as waterworks systems, communal faucet systems, wells with hand pumps, and rainwater collectors to provide safe and sufficient drinking water to some 9 million rural inhabitants;

- **Sanitation**. Construction of facilities such as household, communal and school latrines, animal enclosures and drainage ditches in selected demonstration and pilot villages in each project county;

- **Health/Hygiene Education.** Provision of health/hygiene education to all project counties through training of provincial, county and community administrators, healthcare workers, teachers, and community women and through them the general population; construction of training facilities; dissemination of training and health/hygiene education materials;

- **Technical Assistance and Training.** In conjunction with the ongoing United Nations Development Program (UNDP) project, provision of technical assistance and training in management, finance, procurement, training of trainers, and technical aspects of the first three project components at the national, provincial, prefecture, county and community levels; and

- **Institution Establishment and Project Management.** Construction of project offices and dormitories; provision of office equipment; and financing of project management and supervision activities.

4. There were three legal covenants that, in particular, supported achieving the substance of the objectives and components:

- Satisfactory publication and distribution of design manuals for low-cost rural water supply technologies and rural sanitation facilities was a condition of credit disbursement for civil works;

- Planning and design of subprojects would be done in accordance with the criteria contained in the planning and design manuals and the criteria and procedures for review and approval of subprojects would be followed; and

- Each Project Province and Region shall cause charges for water provided by each piped and nonpiped water systems financed from the proceeds of the Credit to cover: (a) the costs of operating and maintaining such system and a pro-rata portion, determined in a manner acceptable to the Association, of the costs associated with the repayment by the Project Province or Region of the proceeds of the Credit made available to the Province or Region (excluding any grants from the Project Province, Region or Counties to the beneficiaries of water systems), during the period repayments of the Credit proceeds are being made by the Province or Region; and (b) thereafter, the costs of operating and maintaining such system including provision for depreciation on a basis acceptable to the Association.

5. The stated overall objective of the project was assumed to lead directly from the project components, but was not itself monitored. Among the objectives, the clear priority of the Borrower and the project task teams was to "increase coverage in water supply,

sanitation and health/hygiene education." The specific objectives mentioned above were appropriate at the time of appraisal except, in the sanitation improvement objective, that for "enhancing ... replicability through provision of appropriate models." There, even a preliminary economic analysis would have shown that the model villages and the sanitary latrine models being considered were so costly compared to traditional practices that they exceeded willingness to pay of almost all the targeted poor communities receiving improved water supplies.

Implementation Experience and Results

6. **The project *substantially* achieved its major objectives.** The project brought sustainable, improved water supplies to over 9 million poor people. Extensive borrower and IDA supervision consistently revealed highly positive beneficiary villager self-assessment of project results. Depending on the original water problem, reduction in incidence of intestinal diseases reported, particularly among children, and time reduction to fetch water daily have been the main ways in which the project has benefited the project villagers.

7. The physical completion of water facilities and the connection of beneficiaries has been *substantial*. At project close, over 2,000 water supply systems and 70,000 hand pumps and cisterns were operating. In total these systems are currently serving 8.9 million beneficiaries (99 percent of target). The target of 9.06 million beneficiaries is expected to be exceeded when the final 125 water plants, under construction at project close, become operational. In most water supply systems, the water tariff is covering operation and maintenance costs and is either fully or substantially covering agreed debt service set-aside payments. Community participation, although in most respects modest during the feasibility and design stages, has had a strong impact on project results. The health education achievements have been *substantial*. The sanitation achievements of the project have been *partial*. The improved sanitary latrine construction program failed to generate the expected demand from the target population, even with some government subsidy. This problem arose because of affordability concerns and because the linkage between improved sanitation and better health is not strong enough to overcome traditional preferences for fresh nightsoil use for part of crop fertilization. Although demonstration villages in themselves were successful in improving the quality of their environment and educating the village population on health education and sanitation issues, they have not been as successful as planned in producing an obvious demonstration effect in neighboring nonproject villages and counties.

8. The project was affected by a substantial devaluation in 1994 and by the government ending its import duty exemption on World Bank Group-procured goods, which raised the local currency cost of imports. In addition, in the early 1990s, China experienced inflation that substantially increased local currency project costs. However, devaluation increased the local currency value of the IDA Credit sufficiently to offset inflation during the project period, so the Credit remained sufficient for original project goals. Inflation nonetheless partially affected project completion, since local governments

had budgeted their local currency contribution in a fixed nominal amount and some of the provinces resisted making the needed counterpart fund adjustments. The cumulative result of the various financial and management problems was a 12-month delay in completing project activities.

9. Project sustainability is rated as *likely*. Financially, systems are covering operations and maintenance costs and are making a full or significant contribution to debt service repayment through the water tariff. Technically, the equipment and materials are almost all domestically produced and widely available. The mechanical operating skills are available, even in poor counties. Moreover, beneficiaries recognize the time savings and health benefits of safe water, hence have a strong impetus to keep the water systems operating smoothly and finance repairs and expansions. Health and hygiene education programs are ongoing, and the project's contribution was to supplement the existing much larger program, so its sustainability is considered *likely*. IDA performance has overall been *satisfactory* from project identification to completion. Borrower performance was *highly satisfactory* during preparation and has overall been *satisfactory* during implementation and project completion.

Summary of Findings, Future Operations, and Key Lessons Learned

10. Overall, the project is assessed to have achieved a *satisfactory* outcome. *Highly satisfactory* aspects of the project, for which all objectives were met, were the physical completion of water systems, and connection of almost 9.0 million beneficiaries, reported high levels of beneficiary satisfaction, and high levels of cost recovery. The physical implementation of the health and hygiene education program was *highly satisfactory* per the objectives set at appraisal, but since it is not clear that the health messages have resulted in significant behavior changes, the overall rating for this component is *satisfactory*. The sanitation program and demonstration village program are considered to be *satisfactory* as far as physical implementation, but because demand was not generated for the improved latrines program, and the model villages program lacked significant demonstration effect, the overall rating for this component is *unsatisfactory*.

11. Because the Government in China is reorganizing and plans to significantly reduce its staff, a final decision on institutional arrangements to oversee the water systems has not been decided. Currently, the three options under consideration are: (a) maintaining the County Project Offices (CPOs) but expanding their responsibilities to cover all government-sponsored rural water supply projects in the counties; (b) converting the CPOs into Rural Water Supply Companies, which would still allow government budgetary financing for a limited period of time before they would have to fully finance themselves; or (c) allowing the townships to take responsibility for providing services to the village water schemes, since most townships have a water company responsible for town supply, which could provide the technical expertise required. Health intervention initiatives will occur through existing service providers: doctors, women's committees, and through school programs.

12. There are five key lessons from this project. First, long-term loans to poor villages can complement village resources to sustainably and significantly improve water supply. Second, demand for improved latrines is correlated with higher income levels, and, in contrast to improved water supply, the income levels of the rural poor in this project were too low to support the latrine improvement strategy. Third, investing in model villages is not a successful strategy for yielding demonstration effects when the external government financing needed to construct the model is not available to other villages seeking to replicate the model. Fourth, training of water plant managers, operators and accountants is critical to the sustainability of the water plant subprojects and proceeds of the Credit should be made available to ensure that adequate training is taking place. Fifth, intensified traditional approaches to health education have reached a saturation point. In order to increase the acceptance of health messages and behavior modification, the inhibitors for improved practice must be identified, and the health education program modified accordingly.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

(CREDIT 2336-CHA)

PART I: PROJECT IMPLEMENTATION ASSESSMENT

A. PROJECT OBJECTIVES AND DESCRIPTION

1. **Objectives.** As stated in the project Staff Appraisal Report, the overall objective was to improve health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/ hygiene education, technical assistance and training. Through project preparation and implementation, immediate objectives set for the project were to: (a) develop long-term sectoral and subsectoral strategies to prioritize investments at the county level; (b) explore and develop appropriate low-cost alternatives as well as formulate affordable and sustainable programs for water supply, water treatment and sanitation through community participation to maximize project impact; (c) establish and maintain properly staffed institutions as well as provide technical assistance and training to support adoption, implementation and operation of investment programs; (d) increase coverage in water supply, sanitation and health/hygiene education through physical construction, provision of equipment and utility vehicles, technical assistance and training; and, (e) establish ongoing and expanding programs and enhance community participation and replicability through provision of appropriate models, development and distribution of standards and manuals, as well as dissemination of experience and lessons learned.

2. **Components.** The project components were:

- **Water Supply:** construction of facilities such as waterworks systems, communal faucet systems, wells with hand pumps, developed springs, rainwater collectors and related facilities to provide safe and sufficient drinking water to some 9 million rural inhabitants; provision of water quality testing equipment and utility vehicles; continuation of development, introduction and dissemination of new technologies through demonstration, publication and distribution of manuals and guidelines;

- **Sanitation:** construction of facilities such as household, communal and school latrines, animal enclosures and drainage ditches in selected demonstration and pilot villages in each project county; provision of the foundation for replicable programs by developing and demonstrating all aspects of the program that delivers not just latrines but facilities that are demanded, effectively used and sustained for the duration of their service life;

- **Health/Hygiene Education:** provision of health/hygiene education to all project counties through training of provincial, county and community administrators, trainers, healthcare workers, teachers, community women and through them the general population; construction of training facilities; development and dissemination of training and health/hygiene education materials; provision of materials, supplies, equipment and utility vehicles;

- **Technical Assistance and Training:** in conjunction with the ongoing United Nations Development Program (UNDP) project, provision of technical assistance and training in management, finance, procurement, training of trainers, and technical aspects of the first three project components at national, provincial, prefecture, county and community levels; and

- **Institution Establishment and Project Management:** construction of project offices and dormitories; provision of office equipment; and financing of project management and supervision activities.

3. **Covenants.** There were three legal covenants that particularly focused on achieving the substance of the objectives and components:

- Satisfactory publication and distribution of design manuals for low-cost rural water supply technologies and rural sanitation facilities would be a condition of credit disbursement for civil works;

- Planning and design of subprojects would be done in accordance with the criteria contained in the planning and design manuals and the criteria and procedures for review and approval of subprojects would be followed; and

- Each Project Province and Region shall cause charges for water provided by each piped and nonpiped water systems financed from the proceeds of the Credit to cover: (a) the costs of operating and maintaining such system and a pro-rata portion, determined in a manner acceptable to the Association, of the costs associated with the repayment by the Project Province or Region of the proceeds of the Credit made available to the Province or Region (excluding any grants from the Project Province, Region or Counties to the beneficiaries of water systems), during the period repayments of the Credit proceeds are being made by the Province or Region; and (b) thereafter, the costs of operating and maintaining such system including provision for depreciation on a basis acceptable to the Association.

4. **Assessment of Objectives.** The stated overall objective of the project was assumed to lead directly from the project components, but was not itself monitored. Among the objectives, the clear priority of the Borrower and the project task teams was to "increase coverage in water supply, sanitation and health/hygiene education." The specific objectives mentioned above were appropriate at the time of appraisal except, in the sanitation improvement objective, that for "enhancing ... replicability through

provision of appropriate models." There, even a preliminary economic analysis would have shown that the model villages and the sanitary latrine models being considered were so costly compared to traditional solutions that they exceeded willingness to pay of almost all the target poor communities receiving improved water supplies.

B. Achievement of Project Objectives

5. **The project substantially achieved its major objectives.** The project brought sustainable, improved water supplies to over 9 million poor people. Although lacking a monitoring program to measure health and productivity gains, extensive borrower and IDA supervision consistently revealed highly positive beneficiary villager self-assessment of project results. The National Project Office (NPO) conducted a few more formal baseline and follow-up surveys that support this finding (although the survey methodologies have weaknesses). Depending on the original water problem, reduction in incidence of intestinal diseases reported, particularly among children, and time reduction to fetch water daily have been the main ways in which the project has benefited the project villagers. Supervision teams have verified financial sustainability through direct inspection of water plant accounts.

6. **Water Supply.** The physical completion of water facilities and the connection of beneficiaries has been *substantial*. At project close, 2,193 water supply piped networks were operating and an additional 125 water plants were under construction (87 percent of plan), 7,296 hand pump schemes (93 percent of plan), and 63,998 rain catchment systems (116 percent of plan) have been completed. In total these systems are currently serving 8.9 million beneficiaries (99 percent of target; target is expected to be exceeded when the final 125 water plants become operational), and if design population targets are achieved, could supply as many as 12 million beneficiaries during the next 10 to 15 years.

7. Design and construction quality has generally been good, but supervision has revealed weaknesses in a number of systems. On the water plant design side, problems that have been reported in aide-memoires generally fall into the following categories: (a) some system designs may not represent least-cost engineering options, but while unnecessarily increasing costs, in the known cases this has not threatened service affordability and willingness-to-pay; and (b) overoptimistic billable water consumption design parameters have resulted in actual operating levels significantly below design capacities, again increasing unit service costs. Among construction problems, certain "outlier" engineering deficiencies may shorten the service life of individual water plants, or compromise water quality unless rectified, e.g., improperly installed main meters, well heads not sealed or surface water sources not sufficiently protected, poor ventilation and drainage at installations, or improperly installed household meters.

8. Quality water plant management was not a separate objective of the project nor was project financing included for training of water plant managers, engineers and accountants. System operation and maintenance (O&M) has generally been satisfactory, but has also been quite varied. Since weak management performance threatens water

plant sustainability, during project implementation the need to support training for quality management at some water plants became clear. As a result, IDA agreed to allow funds in the technical assistance category to be used for the training of water plant staff.

9. Financial recordkeeping for the water plants has also been variable, but generally it has been satisfactory. Where financial recordkeeping was noted to be poor, accounting staff turnover or lack of training were the causes. As a partial response, financial training was included in the topics suitable for technical assistance funds.

10. **Cost Recovery.** Financial cost recovery in water schemes has been *substantial* and has reached levels unprecedented in other Bank Group-funded rural water supply projects. Of the total investment, beneficiaries have contributed, on average, 30 percent of the investment in upfront cash, materials and labor. In addition, 60 percent of water plants are covering water plant operating costs and the agreed set-aside for debt service repayment through the water tariffs paid by the beneficiaries. Of the remaining 40 percent of water plants, most are covering O&M and a significant portion of the debt service. Almost all piped water systems have met or exceeded the cost recovery covenant.

11. **Community Participation.** Community participation, although in most respects modest during the feasibility and design stages, has had a strong impact on project results. Specifically, villager preference for piped network systems supplying water to yard or house taps forced designers to shift from mostly hand pump systems to piped network systems. Likewise low beneficiary demand for improved sanitary latrines, largely based on their own and hence more realistic assessment of their economic and education level, led to a 50 percent reduction in that construction target. Throughout the project, beneficiaries participated significantly through the provision of cash and in-kind contributions of labor and materials. Original estimates suggested that beneficiaries would pay about 20 percent of the project investment costs in upfront cash and in-kind contributions, and assume, on average, 88 percent of the Credit repayment responsibilities. Together, the beneficiaries were to be responsible for about 71 percent of the investment costs, the remainder to be provided through government counterpart funding at various levels. As of the latest actuals in June 1998, beneficiaries through upfront contributions and assuming the burden of most of the debt repayment through the water tariff, are covering about 74 percent of investment costs.

12. **Health/Hygiene Education.** Health education programs for health educators, women's committees and village leaders, and the dissemination of health educational materials has been widespread and has supported the government's existing health education programs. The NPO reports that some 9.4 million rural women, children and men have received health education under the project. The beneficiaries received health education by attending training classes at the village level, reading health/hygiene educational materials (including posters, pamphlets, videos, etc.), or participating in other health education activities (including public meetings and performances).

13. A Yunnan province report, based on sampling interviews and direct observation, shows significant behavioral changes when compared with baseline survey data. Latrine use has risen for housewives from 92 to 95 percent, and for school-age children from 44 to 86 percent. The incidence of washing hands before eating has risen for housewives from 3 to 83 percent, and for school children from 56 to 98 percent. Drinking boiled water among housewives has risen from 16 to 75 percent, and among school children from 25 to 93 percent. As the survey report states, there may be many other factors such as socioeconomic development that have played roles in these behavior changes, but nonetheless the project itself did help beneficiaries to improve their hygiene behavior and sanitation environment. However, independent observations during routine supervision missions suggests that beneficiaries are not consistently practicing good hygiene, such as boiling drinking water, and washing hands before eating and after using the toilet, even though they knew they should be doing so.

14. A later survey conducted by the Bank Group found that although the behavior messages were being understood by most beneficiaries, the messages were not conveying why poor hygiene led to disease (e.g., germ transmission, disease vectors, etc.). Hence, the messages need to be studied and revised if a significant improvement in behavior modification is to occur.

15. **Sanitation.** The sanitation achievements of the project have been *partial*. Per the original proposal and in terms of the number of household latrines, the improved sanitary latrine construction failed to generate significant demand from the target population, even with some government subsidy. This because of affordability concerns—even the least costly sanitary latrine models can cost half of a poor family's annual income—and the linkage between improved sanitation and better health is not strong enough to overcome traditional preferences for fresh nightsoil use for crop fertilization. At the mid-term review, latrine construction targets were halved. At project close, household latrine construction was 120 percent of the revised plan. School and public latrines also exceeded their revised targets, by 107 percent and 114 percent, respectively.

16. Although demonstration villages in themselves were successful in improving the quality of the environment and educating the village population on health education and sanitation issues, they have not been as successful as planned in producing a demonstration effect in neighboring nonproject villages and counties. There are two reasons for this: (a) government subsidies were used to construct most of the latrine and supporting facilities in the demonstration villages, but similar government financing could not be provided to nondemonstration villages; and (b) the cost of demonstration facilities constructed was high compared to villagers' annual disposable income and no means of providing long-term financing for these assets to nondemonstration villages was devised during the project implementation. Some 84 demonstration villages out of an original target of 112 were completed under the project.

17. **Technical Assistance and Training.** Training of project office staff at all levels—national, provincial and county—was *substantially* achieved and led to

satisfactory implementation of the project by most County Project Offices (CPOs). After the project's mid-term review, Credit proceeds were made available to train water plant staff, thus helping to improve the sustainability of the water systems. As of project close, only 46 percent of the Credit's Consulting Services and Training category had been disbursed, although this does not reflect the level of effort, but rather the use of domestic, hence much cheaper, consultants and trainers than the international consultants anticipated at appraisal. The remaining $331,000 from the category was transferred to the civil works expenditure category per the Government of China's request just before project close. During supervision missions it was noted that where training of project office staff was carried out to a high level and where staff turnover was low or where replacement employees were properly trained, the project progressed smoothly. It was also noted that the quality of water facility financial and operational management was directly correlated with the training received by the operators.

18. **Project Management.** Management responsibilities are shared among central government, project province, project county, and water plant levels. The county and water plants play the key implementation role, with central and provincial governments active in some procurement and overseeing county work. The latter were marginally satisfactory, with administrative financing constraints that held field supervision below desired intensity, but was fully satisfactory when undertaken. Routine reporting requirements were satisfactorily met. At the county and water plant level, the large number of diverse players led to varied performance. Overall, performance objectives were *substantially* achieved, with both auditors and IDA supervision identifying a small number of performance failures that were, in all instances, remedied.

19. **Procurement.** Procurement under the project overall was satisfactory and almost all transactions fully satisfied World Bank Group guidelines. There were more than 2,000 civil works contracts and three international competitive bidding (ICB) contracts carried out under the project. During supervision missions the procurement documentation was reviewed by the IDA team at each CPO. In a few cases where World Bank Group guidelines were not fully complied with, the problems encountered were that the Borrower had used marking or bracketing, which is in agreement with the central government's procurement regulations. In all cases reviewed during supervision, the lowest evaluated responsive bidders were selected, and the result was the same as would have occurred if the Borrower fully complied with Bank Group guidelines. In these cases the mission leader stated in the aide-memoires that the practice of marking and bracketing was not allowed and should not be continued. The ICB procurement was carried out in compliance with Bank Group guidelines, but the bidding documents had to be revised several times in order to meet Bank Group guidelines, and hence there were delays in the ICB procurement process.

20. **Economic Reevaluation**. As stated in the Staff Appraisal Report, "The overall project objective is to improve the health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training." Both the borrower

and task team were persuaded that the inputs—improved water supply, sanitation services, and health/hygiene education—would necessarily lead to health and productivity improvements. In support of this, they reported two studies of previous water, sanitation or health education projects in a range of countries that showed positive health outcomes. The Staff Appraisal Report provided no details, or even citations, of those studies, but one seems clearly to be the well-known 1991 paper by Esrey, et al. ("Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma," *WHO Bulletin 69* (5) (1991): 609-621). The borrower, and IDA team, reasoned that improved health would lead to improved productivity.

21. Neither the borrower nor the appraisal team undertook further benefit analysis. Nor did they put into place a monitoring program that would allow ex-post evaluation of the program assumptions. However, the Esrey paper shows a substantial range of reductions in disease incidence from the various programs analyzed, while making the point that few of the studies would themselves pass a strong methodological test. In the worst cases, the Esrey paper reports investments showing little or no impact on disease incidence. And, of course, disease incidence does not have a one-to-one relationship with productivity. In their defense, the appraisal team explicitly recognized that serious evaluation efforts on health impacts are difficult to do well, probably contributing to their decision not to invest resources in this area. With this history, the ICR team cannot reanalyze the expected benefits.

22. With the expectation of substantial health benefits (Staff Appraisal Report, para. 5.5), the team concentrated its preparation and appraisal attention on two other elements of project design—beneficiaries and cost-effective inputs.

23. A major departure of this second rural water project from the first (China: Rural Water Supply Project, Cr. 1578) can be found in the targeted beneficiaries. The first project invested primarily in larger water systems, often serving towns rather than villages. It also included several wealthier provinces, including Beijing Municipality. While successfully implemented, beneficiaries tended to be among the better-off rural residents. The government and Bank Group agreed that the second project would focus on poorer rural areas and, within them, on poorer people.

24. During project preparation, the teams devoted considerable effort to developing an effective targeting mechanism to reach their objective of serving "the poorest and most needy inhabitants of rural China." First, the project was limited to six poorer provinces. Then the targeting mechanism used four indicators: income, water-related health, water shortages, and minority prevalence, to identify potential beneficiary counties. Finally, it eliminated county towns as potential beneficiaries, then specified preferred technologies more suited to lower service levels, hence lower-income communities. Within those communities, water supply solutions would be designed to benefit all residents. This approach took advantage of the relative homogeneity of Chinese villages, a consequence of strictly limited migration and the communal system prevailing for so many years. The

counties chosen for project participation had 1989 (the most recent year statistics were available) average per capita incomes ranging from $30 to $150.

25. The targeting effort was successful. That success cannot be understated, given that the project design targets the poor while expecting a 20 percent initial capital contribution (in some combination of cash, materials and labor) from villagers and passing on the full loan and O&M obligation to the benefiting village. This financial test forces a much more careful assessment of sustainability than the traditional practice of full capital subsidies. Despite the fact that the very poorest villages could not be included due to their inability to generate sufficient cash, the borrower did an excellent job of identifying poor villages whose need was for long-term financing rather than welfare handouts. Supervision teams visited a large number of beneficiary villages and found very few where household assets or other wealth indicators suggested mistargeting.

26. The project design for cost-effective inputs complemented the beneficiary targeting work. The borrower utilized extensive domestic and international expertise in preparing design manuals that would help bring effective nonpiped, small system and sanitation solutions to rural areas. These manuals are an important resource for engineers trained in standard municipal designs and were completed and disseminated to meet design needs, as well as a disbursement condition. Bank Group supervision teams have found the manuals in broad use several years after project inception and systems based on them to effectively meet village needs.

27. The project design anticipated minimal numbers of household water connections, instead favoring standpipes and other group facilities. This was driven by the desire to maximize the number of beneficiary villages. However, in practice many residents of villages receiving piped water have demonstrated a strong preference for household connections. This demand has been met without reducing project scope, as households wanting that service have simply been asked to pay the extra cost of the connection. Since a household connection reduces water-gathering time, increased use typically results, as does increased villager commitment to proper system functioning.

28. Just as unanticipated household demand led to more frequent system connections than anticipated, a lack of household demand led to lower sanitation coverage. The sanitation component sought "to promote demand for improved sanitation" by bringing a few improved latrines to all villages, and comprehensively upgrading selected villages in several aspects, including drainage, latrines, and livestock compounds. The villages would thereby become models for their neighbors.

29. The project successfully introduced latrines and upgraded villages, but by the mid-term review it was clear that the learning effect was small. Latrine use was already extensive in project villages, due to a long history of collecting feces for use as fertilizer. The sanitation component introduced latrine designs with longer retention periods and composting features, both designed to lower pathogen counts before use of feces on fields. As mentioned above, design manuals were also prepared for this component.

Unfortunately, the design characteristics of composting latrines left most villagers unable to build the latrines themselves, and the latrines required manufactured components that drove up costs. Since traditional latrines required only labor and locally gathered materials, most villagers found the new latrines an unattractive alternative if not accompanied by a substantial subsidy. The same was true of the other measures designed for model villages. Because government lacked the money to subsidize more than the pilot programs, neighboring villagers or villages could not replicate the upgraded facilities provided by the program.

30. The latrine/model village program scope was substantially reduced at the mid-term review. Although Chinese domestic programs have successfully introduced similar changes in wealthier villages, the borrower concluded, and the Bank Group agreed, that poor villages served by this Credit simply lacked the means to substantially upgrade sanitary facilities at their own expense. Emphasis was therefore placed on health education inputs to which villagers could respond without major cash expenditures. This project provided a valuable test of compost latrines in poor areas, but the lesson was that China cannot expect broad uptake in poor areas.

31. The water supply services are community-owned and operated, with the goal of cost recovery but not profit. For this reason, the appraisal team did not estimate a project financial rate of return and no re-estimation could take place. The other components had no ongoing revenue flows.

C. Implementation Record and Major Factors Affecting the Project

32. Factors not generally subject to government control had little influence on the achievement of project objectives, so this discussion will focus on factors under government or implementing agency control.

33. During the project period, the Chinese government ended its earlier practice of maintaining an overvalued local currency, resulting in substantial devaluation in 1994. One year later the government also ended its import duty exemption on World Bank Group project-procured goods. These actions raised the local currency cost of imports. The first of them reduced import competitiveness and the second import desirability (tariffs were not factored into bid evaluations, but certainly were by borrowers into total costs). However, all major equipment and materials are produced in China to acceptable quality levels and although the import composition of the project fell, project components continued to meet quality and cost goals.

34. Government macroeconomic policies in the early 1990s fostered inflation that substantially increased local currency project costs. However, devaluation increased the local currency value of the IDA Credit sufficiently to offset inflation during the project period, so the Credit remained sufficient for original project goals. Inflation nonetheless partially affected project completion, since local governments had budgeted their local currency contribution in a fixed nominal amount and some of the provinces resisted

making the needed counterpart fund adjustments. The adjustments were eventually made, but played a large role in the delayed project completion.

35. The NPO funding shortfall is discussed under Borrower Performance. This affected their supervisory effort and, through that, partially reduced both their effectiveness and overall project quality. The NPO also had some difficulty writing procurement specifications to adequate quality and leading the subsequent evaluation and contracting effort, leading to delays in ICB goods procurement. This, too, partially affected timely project construction, contributing to the delayed completion.

36. The cumulative result of the various financial and management problems was a 12-month delay in completing project activities, with an overall disbursement period of 89 months compared to the 72 months foreseen at appraisal.

37. **Implementation Timing.** The project's implementation period was officially extended by one year to December 31, 1998 after the project mid-term review to allow sufficient time to complete construction of water facilities, connection of target beneficiaries and training of water plant staff. Delays in counterpart funding commitments and in preparation of satisfactory ICB bidding documents were the main reasons the project needed to be extended to meet the targets.

38. **Project Costs.** The project experienced significant cost increases in Renminbi terms, but is expected to meet appraisal estimates in US dollar terms. At appraisal, the project was expected to cost Y 1,094.6 million or $189.1 million equivalent. As of June 30, 1998, the project investment totaled Y 1,377.7 million or 126 percent of the original estimate. Project financing expectations at appraisal were divided as follows: IDA, 58 percent; various government levels, 22 percent; and communities and individuals, 20 percent. Project financing in Renminbi terms as of June 30, 1998 was: IDA, 51 percent; various government levels, 19 percent; and beneficiaries, 30 percent. Beneficiaries in all provinces and regions have exceeded their planned contributions by an average of 124 percent. The variance in project costs and project financing resulted from two changes: (a) significant domestic inflation—contingencies were originally estimated as 41 percent of the base cost in Renminbi terms, but in actuality, contingencies to base costs were 78 percent; and (b) subproject redesign from mostly hand pump systems to mostly piped water systems—this in response to beneficiary demand. The debt service burden on projects constructed after 1994 is much larger in Renminbi terms than originally anticipated because of a 56 percent devaluation in the Renminbi/US dollar exchange rate that occurred in 1994. Increases in average per capita income during the project appraisal and implementation period were on the order of 17 percent per year. The significantly increased incomes make it likely that debt repayment will not be a significant problem.

D. Project Sustainability

39. Project sustainability is rated as *likely*. Financially, systems are covering O&M costs and are making a full or significant contribution to debt service repayment through

the water tariff. This provides the financial resources needed for sustainable operation. Technically, the equipment and materials are almost all domestically produced and widely available. The mechanical operating skills are available even in poor counties, where hand tractors and other machinery of a technical level comparable to the water plants are in common use. To bolster those inputs, county governments plan to continue, in a modified form, the function of the county project office, to provide technical support for the project's assets as well as the Government's broader rural water supply program. Moreover, beneficiaries recognize the time savings and health benefits of safe water, hence have a strong impetus to keep the water systems operating smoothly and finance repairs and expansions. Health and hygiene education programs are ongoing, and the project's contribution was to supplement the existing much larger program, so its sustainability is considered *likely*. The two subsequent Bank Group-financed rural water supply and sanitation projects have recognized the successful elements of this project, while being modified to reflect lessons learned.

E. IDA Performance

40. IDA's performance in project identification, preparation and appraisal was satisfactory. This project developed from the Rural Water Supply Project (Cr. 1578), but represented a substantial evolution in terms of poverty targeting and in the inclusion of sanitation and health education. Identification and preparation of this project drew directly on results from a UNDP/World Bank Water and Sanitation Program project undertaken in Xinjiang and Inner Mongolia, both included in this project, and on a 1990 European Economic Community-funded rural water sector study and training program. Simultaneously with preparation of this project, Bank Group staff worked with UNDP staff in preparing a supporting UNDP project to strengthen management in beneficiary counties, provinces and the national project office. The IDA preparation team played an effective role in facilitating these substantial external partner efforts. That team contained a strong mix of water and sanitation engineers familiar with the technical and management requirements of providing the needed services, health education specialists, and a financial analyst and economist. They effectively conveyed international experience in similar conditions and helped translate that experience into actual design practice in China. Appraisal was carried out with a full team of specialists, ranging over water supply, sanitation, and health education. The economic analysis was the one area of appraisal weakness, because it made no apparent effort to establish willingness-to-pay for the improved sanitation. Even a simple effort would have shown that villagers lacked the ability to replicate the highly subsidized model latrines introduced by the project.

41. IDA teams also demonstrated satisfactory performance in project supervision. The 75 project counties and thousands of beneficiary villages presented a particular supervision challenge. But the 13 supervision missions over the project life visited a broad selection of project counties and villages, utilized county-level audit reports as an important complement to direct visits, and worked consistently to strengthen the provincial and national project office supervision efforts. Initially, rapid task manager turnover, with three task managers in the first three years of project life, may have

weakened supervision efforts, although continuity was not wholly broken, as the second task manager had been on the appraisal team and the third a member of the second task manager's supervision team. Staff rotation forced yet another task manager change late in the project life, although again the new task manager had been a key member of earlier supervision teams. These changes did not impede effective Bank Group advice and Bank Group supervision was key in helping the borrower identify why the sanitation demonstration program was not progressing as expected, and, through the mid-term review, rebalancing the project to adjust for that.

42. Bank Group decentralization had an important, positive impact on supervision in the latter stages, as a field-based engineer and a financial analyst combined with a locally hired consultant sociologist to provide a strong supervision team located in the same city as the national project office. This considerably increased the frequency of contact with that and other project offices and brought welcome flexibility to project site visits. With that change, the traditional Bank Group technique of counting mission numbers lost relevance.

F. Borrower Performance

43. Borrower preparation performance was highly satisfactory. The borrower identified appropriate beneficiary counties and played a large role in developing sustainable village-level project financing mechanisms. The project design was based on high levels of beneficiary financial commitment, hence project ownership. All project counties prepared feasibility studies and preliminary project designs appropriate to their conditions. The NPO took the lead in developing, with international consultants, the needed design manuals.

44. Borrower implementation performance was much more mixed. The NPO was expected to play a major supervisory role but their administrative financing arrangements, developed during project preparation, were not honored during implementation. With inadequate resources, the NPO could not act with the independence and efficiency envisioned at appraisal. Instead, they focused on ICB procurement, engineering review and approval, training, meeting Bank Group reporting deadlines, and accompanying Bank Group teams to the field. NPO staff quality was good, although their numbers were inadequate. Reporting deadlines were met, and reports were of good quality, but NPO procurement delays were common. In a larger sense, sector and financial policies remained generally positive.

45. Relative to their task, the six provincial project offices (PPOs) were generally better financed and more active than the NPO. But they, too, provided less aggressive field supervision than the Bank Group desired. In similar, but domestically funded, development projects the provincial level typically becomes less active after appraisal, focusing on reviewing progress reports and authorizing financial transfers. Counterpart funding generally lagged project needs at the height of the project investment cycle and contributed to implementation delays. Overall, in spite of having well-qualified

individuals in the provincial project offices, some provinces performed to satisfactory levels while others fell short of fully satisfactory performance.

46. With 75 counties and thousands of villages, this level is difficult to generalize about. This level also faced the greatest challenges, as they were least familiar with Bank Group requirements, but they build and run the systems. The counties deliver training and oversee design, procurement and construction. The villages contribute to building and then run their systems. Village beneficiaries demonstrate very high levels of water system ownership. The project succeeded in reaching coverage targets while instituting sustainable financing and operations management. On the whole, then, this group has satisfactory performance. In many locations, "highly satisfactory" would be a fairer assessment, but several instances of deficient performance have also been found.

47. Covenant performance was good. Government auditors performed well in most counties, providing additional implementation guidance.

G. Assessment of Outcome

48. Overall, the project is assessed to have achieved a *satisfactory* outcome. *Highly satisfactory* aspects of the project, for which all objectives were met, were the physical completion of water systems, and connection of almost 9 million beneficiaries, reported high levels of beneficiary satisfaction, and high levels of cost recovery. The physical implementation of the health and hygiene education program was *highly satisfactory* per the objectives set at appraisal, but since it is not clear that the health messages have resulted in significant behavior changes, the overall rating for this component is *satisfactory*. The sanitation program and demonstration village program are considered to be *satisfactory* as far as physical implementation, but because demand was not generated for the improved latrines program, and the model villages program lacked significant demonstration effect, the overall rating for this component is *unsatisfactory.*

H. Future Operation

49. The national, provincial and county leaders have given considerable thought as to what type of institutional arrangements would safeguard the assets created under the project, provide a channel for loan repayment, provide training and service assistance to water plant staff, and continue the health education initiatives. In previous missions, the Bank Group had been informed that where budgets permitted, counties would like to retain the CPOs and expand their responsibilities to all rural water systems in the county. They would be responsible for new construction but would expand their capacity to focus more on supporting maintenance of the completed systems. During the ICR mission, however, the Bank Group was informed that the Government's personnel reorganization (designed to cut government staff levels by 40 to 50 percent) would mean that CPOs may not be able to continue to receive government budget allocations. The two provinces visited during the ICR mission stated that they were still reviewing their options, but that converting the CPOs into Rural Water Supply Factories or Companies (RWSCs) was one option they were considering. Apparently, the change of legal status would allow for

government budget support for at least the next couple of years. Other than purchasing spare parts and selling these to the water plants as requested (with no markup), the provincial and county leaders had no intention of charging a "service fee" to provide maintenance and repair services or for training of staff. These services would be useful in areas short of local materials distributors or mechanics, but the Bank Group has encouraged the CPOs and PPOs to consider charging small service fees soon, to avoid unfair competition with private service providers and so that as government budgets decline a separate revenue base could be built. In addition, transfer of all fixed assets was to be completed by project close, with the ownership of most systems residing with village committees or township governments (in the case where a system covers multiple villages). A third option is to allow the town or townships to manage the plants, since many of them have some kind of existing water supply entity for the township town. Health intervention initiatives will occur through existing service providers: doctors, women's committees, and through school programs.

I. Key Lessons Learned

50. There are five key lessons from this project that have been taken into consideration during the preparation of the follow-on National Rural Water Supply Project (Cr. N027-CHA) and Fourth Rural Water Supply and Sanitation Project (Ln. 4485-CHA/Cr. 3233-CHA). First, long-term loans to poor villages can complement village resources to sustainably and significantly improve water supply. The project demonstrates that government capital subsidies (if needed at all) can be substantially lower than typically argued for when discussing improved rural water for the poor. What the project does not reveal is how much of the success reflects the social capital built up during the era of collective action in Chinese villages during their now-ended period of communal organization. Second, demand for improved latrines is correlated with higher income levels, and, in contrast to improved water supply, the income levels of the rural poor in this project were too low to support the latrine improvement strategy. Third, investing in model villages is not a successful strategy for yielding demonstration effects when the external government financing needed to construct the model is not available to other villages seeking to replicate the model. Fourth, training of water plant managers, operators and accountants is critical to the sustainability of the water plant subprojects and proceeds of the Credit should be made available to ensure that adequate training is taking place. Fifth, intensified traditional approaches to health education have reached a saturation point. In order to increase the acceptance of health messages and behavior modification, the inhibitors for improved practice must be identified, and the health education program modified accordingly.

PART II: STATISTICAL TABLES

TABLE 1: SUMMARY OF ASSESSMENTS

A. Achievement of Objectives	Substantial	Partial	Negligible	Not Applicable
Macroeconomic policies				✓
Sector policies		✓		
Financial objectives	✓			
Institutional development	✓			
Physical objectives	✓			
Poverty reduction				✓
Gender issues				✓
Other social objectives				✓
Environmental objectives				✓
Public sector management				✓
Private sector development				✓
Other (specify)				✓

B. Project Sustainability	Likely	Unlikely	Uncertain
	✓		

C. IDA Performance	Highly Satisfactory	Satisfactory	Deficient
Identification		✓	
Preparation assistance		✓	
Appraisal		✓	
Supervision		✓	

D. Borrower Performance	Highly Satisfactory	Satisfactory	Deficient
Preparation	✓		
Implementation		✓	
Covenant compliance		✓	
Operation (if applicable)			

E. Assessment of Outcome	Highly Satisfactory	Satisfactory	Unsatisfactory	Highly Unsatisfactory
		✓		

TABLE 2: RELATED BANK GROUP LOANS/CREDITS

Loan/Credit Title	Purpose	Year of Approval	Status
Preceding operation			
Cr. 1578-CHA Rural Water Supply Project	Water supply; health education to rural areas	1985	Closed
Following operations			
Cr. N027-CHA National Rural Water Supply Project	Water supply; sanitation/health education to poor rural areas	1997	Implementation
Ln. 4485-CHA/Cr. 3233-CHA Fourth Rural Water Supply and Sanitation Project	Water supply; sanitation/health education to poor rural areas	1999	Board completed, not yet signed

TABLE 3: PROJECT TIMETABLE

Steps in project cycle	Date planned	Date actual/latest estimate
Identification (Executive Project Summary)	N/A	April 1990
Preparation	N/A	1990/1991
Appraisal	N/A	May-June 1991
Negotiation	N/A	December 1991
Board presentation	N/A	February 11, 1992
Signing	N/A	April 10, 1992
Effectiveness	N/A	July 23, 1992
Project completion	December 1997	December 1998
Loan closing	April 1998	December 31, 1998

TABLE 4: LOAN/CREDIT DISBURSEMENT: CUMULATIVE ESTIMATE AND ACTUAL /a

($ million)

	FY93	FY94	FY95	FY96	FY97	FY98	FY99
Appraisal estimate	26	51	76	94	107	110	
Actual	7.00	41.38	47.78	77.84	99.34	110.63	112.42/b
Actual as percent estimate	26.92	81.14	62.87	82.81	92.84	100.57	100.0
Date of final disbursement	08/03/93	06/29/94	07/27/95	06/24/96	07/11/97	03/24/98	05/24/99

/a Data from World Bank Group Loan Department.
/b Actual disbursed amount differs from the appraisal estimate due to changes in SDR/US dollar exchange rate.

TABLE 5: KEY INDICATORS FOR PROJECT IMPLEMENTATION

Not applicable for this project.

TABLE 6: KEY INDICATORS FOR PROJECT OPERATIONS

Not applicable for this project.

TABLE 7: STUDIES INCLUDED IN PROJECT

None

TABLE 8A: PROJECT COSTS
(Y million)

Item	Appraisal estimate			Latest estimate (6/30/98)		
	Local	Foreign	Total	Local	Foreign	Total
Water supply	319.3	322.7	642.0	549.0	666.7	1,215.7
Sanitation construction	31.3	0.0	31.3	43.9	0.0	43.9
Health and hygiene education	22.8	9.7	32.5	15.3	5.5	20.8
Technical assistance and training	26.9	8.4	35.2	7.4	2.6	10.0
Institutional establishment and project management	25.8	6.6	32.4	67.9	19.4	87.3
Total Base Cost	**426.1**	**347.3**	**773.4**			
Contingencies	177.0	144.1	321.2			
Total Project Cost	**603.1**	**491.5**	**1,094.6**	**683.5**	**694.2**	**1,377.7**

TABLE 8B: PROJECT COSTS
($ million)

Item	Appraisal estimate			Latest estimate (6/30/98)		
	Local	Foreign	Total	Local	Foreign	Total
Water supply	60.1	60.8	120.9	66.8	81.0	147.8
Sanitation construction	5.9	--	5.9	5.3	0	5.3
Health and hygiene education	4.3	1.8	6.1	1.9	0.7	2.5
Technical assistance and training	5.1	1.6	6.6	0.9	0.3	1.2
Institution establishment and project management	4.9	1.2	6.1	8.2	2.3	10.6
Total Base Cost	**80.3**	**65.4**	**145.6**			
Contingencies	23.9	19.5	43.5			
Total Project Cost	**104.2**	**84.9**	**189.1**	**83.1**	**84.4**	**167.5**

TABLE 8C: PROJECT FINANCING
($ million)

Item	Appraisal estimate			Latest estimate (6/30/98)		
	Local	Foreign	Total	Local	Foreign	Total
IDA	25.1	84.9	110.0			84.9
Domestic contribution	79.1	-	79.1			82.6
Total	**104.2**	**84.9**	**189.1**			**167.5**

TABLE 9: ECONOMIC COSTS AND BENEFITS

Not applicable.

TABLE 10: STATUS OF LEGAL COVENANTS

Agree-ment	Section	Cove-nant Type	Present Status	Original fulfillment date	Revised fulfillment date	Description of covenant/a	Comments
DCA	3.04	1	C			Borrower to open and maintain six provincial revolving accounts, each of an amount equivalent to three months' local expenditures by 4/30/92	
DCA	4.01(a)(i)	1	C			Borrower to maintain records and accounts of central components	
DCA	4.01(a)(ii)	1	C			Borrower to consolidate the audit of records and accounts of provinces.	
DCA	4.01(b)	1	C			Borrower to furnish annual audit reports including those of Special Account no later than six months after the end of each fiscal year.	
DCA	Sch.3.1	5	C			Borrower to maintain NPO with staffing and functions satisfactory to IDA.	
DCA	Sch.3.2	9	CD			Borrower to prepare and consolidate annual project implementation plan (PIP for the following year for IDA's review and approval by Oct.15 each year).	
DCA	Sch.3.3	5	C			Borrower to publish design manuals for nonpiped water supply facilities and sanitation facilities.	
DCA & PA	Sch.3.4 Sch.2.II.2	9	C			Responsibility for review of water supply system designs are : NPO: Y 2.0 million or more; PPO:>Y 500,000 - <Y 2.0 million; CPO: Y 500,000 or less	
PA	3.01(a)	1	C			Provinces to maintain records and accounts of activities and transactions within its jurisdiction.	
PA	3.01(b)	1	C			Province to furnish annual audit reports no later than six months after the end of each fiscal year.	
PA	Sch.I.I.A.2	10	C			ICB goods contract to be grouped in bid packages of $200,000 or more.	
PA	Sch.I.I.C	10	C			For civil works, > $400,000: by NCB, < $400,000: by local shopping with at least three quotations, <$20,000: by force account with aggregate total no more than $13.5 million. Total local shopping and force account not to exceed $ 63.0 million.	
PA	Sch.I.D.I	9	C			IDA to review contracts above $500,000 for goods and $2.0 million for civil works. Contract to be furnished to IDA prior to first payment out of Special Account.	
PA	Sch.2.1	5	C			Province to maintain PPO and CPOs satisfactory to IDA.	
PA & Minutes of Neg.	Sch.2.II.1	9	CD			Province to prepare annual PIP for following year by Sep. 1 of each year. PIPs to include information on high fluoride > 2.0 mg/liter villages.	
PA	Sch.2.II.3	3	C			Provinces to onlend credit at: maximum maturity of 20 years including 5 years grace; interest of 4% a year; provinces to bear all foreign exchange risks.	
PA	Sch.2.II.4	2	CP			Water charges to cover full O&M costs and depreciation or credit repayment, excluding grants from government.	

Covenant Class:
1 = Accounts/audits
2 = Financial performance/revenue generation from beneficiaries
3 = Flow and utilization of project funds
4 = Counterpart funding
5 = Management aspects of the project or executing agency
6 = Environmental covenants
7 = Involuntary resettlement
8 = Indigenous people
9 = Monitoring, review, and reporting
10 = Project implementation not covered by categories 1-9
11 = Sectoral or cross-sectoral budgetary or other resources allocation
12 = Sectoral or cross-sectoral policy/ regulatory/institutional action
13 = Other

Status:
C = covenant complied with
CD = complied with after delay
CP = complied with partially

Abbreviations:
NCB = National Competitive Bidding
PIP = Project Implementation Plan

/a Description of covenant includes the original fulfillment date.

TABLE 11: COMPLIANCE WITH OPERATIONAL MANUAL STATEMENTS

There was no significant lack of compliance with an applicable Bank Operational Manual Statement (OD or OP/BP)

TABLE 12: IDA RESOURCES: STAFF INPUTS

Stage of project cycle	Actual /a	
	Weeks	$'000
Preparation to appraisal	102.1	302.9
Appraisal	21.1	73.2
Negotiations through Board approval	7.1	25.6
Supervision	111.6	362.3
Completion /b	14.5	25.0
Total	**256.3**	**789.0**

/a IDA management information system did not record the planned staff-weeks and planned cost.
/b Completion figures are estimates only; actual figures not yet known.

TABLE 13: BANK RESOURCES: MISSIONS

Stage of project cycle	Month/year	No. of persons	Days in field	Specialized staff skills represented	Performance rating /a		Types of problems
					IP/b	DO/b	
Through Appraisal	N/A	N/A	N/A	Financial, engineering, economic, sociology, health education, environment	N/A	N/A	N/A
Appraisal through Board approval	May-Jun 1999	6	N/A	Financial, engineering, economic, sociology, health education	N/A	N/A	N/A
Supervision /c	Jun 1992	5	6	Financial, engineering, sanitation	N/R	N/R	Project Launch Workshop
	Jul-Aug 1993	6	21	Financial, engineering, sanitation, health	2	1	Pass through of foreign exchange risk to county; slow ICB preparation
	Jul-Aug 1993	5	16	Financial, health education, engineering, sanitation	1	1	ICB procurement delay, counter part fund delay, shortage of project office staff.
	Jul 1994	4	22	Health education, economic, engineering	S	S	Some project offices not adequately staffed; lack of NPO funding.
	Oct 1994	1	2	Economic	N/A	N/A	Informal discussions with Borrower in Beijing; ICB procurement delay, and lack NPO office funding.
	Apr 1995	1	2	Economic	U	S	Overall project delay due to slow ICB, lack of counterpart funds
	Nov 1995 & Jan-Feb 1996	4 4	19 30	Financial, engineering, economic, sociology, health education	S	S	Mid-term review; some counterpart funding delays; one year lag in water supply program; slow adoption of latrine program
	Oct-Nov 1996	7	13	Financial, engineering, economic, sociology, health education	S	S	Slow adoption of latrine program; one year lag in water supply program
	Nov 1997	3	8	Financial, engineering	S	S	Poor financial records; poor operational management
	Jan 1998	3	8	Financial, engineering	S	S	No problems in Guangxi
	Sep 1998	6	15	Financial, engineering, economic, sociology, health education	S	S	Possible misprocurement; poor financial records; tariff not covering debt service in some cases
Completion	Nov-Dec 1998	6	13	Financial, engineering, economic, sociology	S	S	Tariff not covering debt service in some cases, possible misprocurement

/a 1: Highly satisfactory; 2: Satisfactory; U: Unsatisfactory; S: Satisfactory.
/b IP: Implementation status; DO: Development objectives.
/c Since project task management transferred to the Resident Mission in February 1998, numerous meetings have taken place during which project issues were discussed. These meetings, which impact project supervision, are not shown in the table.

ANNEX A: BORROWER'S CONTRIBUTION TO THE ICR

I am very glad to inform you that NPO agrees, in principle, the ICR text agreed by the two sides through talking on the line on June 25, 1999. The effort and the sprit of cooperation made by the Bank are really appreciated.

Besides, I also want to inform you of the NPO's comments on the ICB management, i.e., to the causes for ICB procurement delay, NPO and the Bank should commonly shoulder the responsibilities. Especially in the process of ICB 1 and 2, NPO did not finish the bidding documents in line with the requirements of the Bank, as led to the delay of goods supply, hence hindered the overall progress of the project. On the Bank's side, the frequent change of task manager, too long the time of reviewing and approving the bidding documents, frequent changes of procurement experts, and different standards of reviewing and approving all bring impact to the ICB procurement delay. For example, after the review and confirmation of the first ICB bidding documents by the Bank, the procurement was completed. Yet, the second ICB procurement for the same goods/ materials/equipment, with the same bidding documents in use, was asked by a new expert of reviewing and approving the procurement to be changed greatly on its format, as is one of the causes of ICB procurement delay. This lesson is also to be learned.

ANNEX B: ICR MISSION'S AIDE MEMOIRE

November 23 to December 4, 1998

AIDE-MEMOIRE

A. INTRODUCTION

1. An IDA mission consisting of Ms. Dawn Vermilya (mission leader/financial analyst), Mr. George Plant (sanitary engineer), Mr. Mark Wu (project analyst), Mr. Charles Andrews (water supply specialist), and Ms. Li Xiaofeng (project assistant), visited Inner Mongolia and Yunnan between November 23 to December 4, 1998, to conduct the implementation completion mission (final supervision mission) for the Rural Water Supply and Sanitation Project (RWSS). Mr. Guy Alaerts (water quality specialist) accompanied the mission in Inner Mongolia to review fluoride issues, and Mr. Huang Ping (sociologist) accompanied the mission in Yunnan to review health education, sanitation and beneficiary participation issues. In each province and autonomous region the mission met with provincial leaders to discuss provincial project issues. Meetings were also held with the National Project Office (NPO), Inner Mongolia and Yunnan Autonomous Region Project Offices (PPOs), and the Tuoketuo and Baoshan County Project Offices (CPOs). A wrap-up meeting with the NPO, SDPC and MOF was held on December 10, 1998.

2. The mission expresses its sincere appreciation to the provincial leaders, NPO, PPOs, CPOs and officials of other agencies for the assistance and cooperation provided the mission. In particular, meeting arrangements with the Inner Mongolia Epidemiological Station and fluoride and arsenic specialists were valuable to the mission. This aide-memoire summarizes the findings and recommendations of the mission, as well as next steps on further preparation of the Implementation Completion Report. The main text of the aide-memoire deals with project-wide issues. A list of persons met is attached as Annex 1. Annex 2 is the government's draft Operational Plan for the project. Annex 3 is a summary of the mission findings on the status of fluoride contamination, monitoring and treatment in Inner Mongolia. Annex 4 is a summary of the audit irregularities to be addressed. Annex 5 contains Bank's advise on institutional arrangements for the water systems during the operational phase. The mission bases its views on the most recent national progress report as of June 1998 and site visits during the past year to Guangxi, Xinjiang, Gansu, Inner Mongolia and Yunnan (the Hunan visit was cancelled due to severe flooding).

B. PROJECT IMPACTS

3. In terms of physical achievement, the mission considers the project to be highly satisfactory. Based on the mid-term 1998 Progress Report, project beneficiaries total 7.92 million, but it is expected that by project close on December 31, 1998 the original target of 9.097 million beneficiaries will have received safe and sufficient drinking water, and this is further evidenced by the final connection rates seen in Inner Mongolia and Yunnan of 100% and 99%, respectively. A total of more than 2400 pipe water systems and 70,000 hand pumps and cisterns

will have been constructed by project close. The capacity of the systems built allows for future expansion to cover up to about 12 million beneficiaries. Where improved water supply systems have been installed and complemented by health and hygiene education and improved sanitation facilities, clear benefits have accrued to the beneficiaries. The nature of these benefits vary depending on the initial water and health problems. The problems addressed in this project have been numerous and include: seasonal lack of water, polluted water sources, high fluoride and arsenic content water, remotely located water sources, high levels of dysentery, hepatitis and other water-borne diseases. The more dramatic the original water problem, the greater the accrued benefits have been to the village beneficiaries, but in almost all cases beneficiaries view the project as having substantially reduced their time to fetch water and/or improved their families' long-term health. Physical targets for health and hygiene education training and project office staff training are also likely to be fully realized, if not exceeded. The revised estimates for the sanitation program are also likely to be met, if not exceeded. Based on the improved emphasis on training, the mission upgraded the status of training from unsatisfactory to satisfactory.

4. Concerning institutional establishment and long-term sustainability of project assets, the mission is concerned with the deterioration of both cost recovery levels and water system maintenance practices seen in the past two missions. Based on the findings of the last two missions, the Bank is concerned that unless improvements are made on both counts a significant portion of the piped water systems will have a reduced service life and therefore reduce the project's future impact. For this reason, the mission downgraded the status of financial covenants (cost recovery) from satisfactory to unsatisfactory. Further investigation is expected to clarify the extent of the problems with cost recovery and the underlying reasons at which time the status of financial covenants may be reverted to satisfactory.

5. Beneficiary participation though modest during the feasibility and design stages, has had a strong impact in altering the type of water supply system received-- hand pump systems were converted to piped water systems, and in reducing the scale of the sanitation program -- it was cut in half. This reflects beneficiaries increased ability to pay for a higher service standard, and beneficiaries have contributed well over 25% of the upfront project costs, plus have paid substantial amounts to cover the costs of house hold connections (these costs are outside the project scope) and continue to support the majority of systems through substantial tariff payments. Beneficiaries have shown much less willingness to invest their own funds and time in upgrading their private sanitation facilities.

6. The Borrower provided its views on implementation phase of this project. As of June 30, 1998, 2318 water plants have been constructed, 87.27 percent of the original plan have been finished. 8.89 million rural residents have been benefiting from the project. During last five years, 84 demonstrative villages have been established. Local beneficiaries benefited from the improved sanitation and health education and initiated to set up 12 demonstrative villages and 7,124 household latrines in non project areas. Through project implementation, economic benefits and social impact has improved remarkably as well as having access to improved water. A survey conducted by the NPO shows about 203 water plants revenue exceed their cost; 960 water plants are not fully covering their operation and depreciation costs. Hunan, Guangxi and Xinjiang have fared the best on cost recovery. The Borrower thinks government subsidies can solve the cost recovery issue.

C. PROJECT MANAGEMENT

Project Offices

7. The National Project Office is an experienced team but is understaffed to meet the needs of simultaneously implementing two projects and preparing a third project and managing the other responsibilities of the NPHCC's water supply program. In general, the provincial project offices visited in Inner Mongolia and Yunnan have reasonable staff levels and competency. The Yunnan and Inner Mongolia PPO staff levels are presently stressed because they have been implementing two projects at the same time (RWSS and NRWS) but this is expected to improve soon with the completion of RWSS. County Project Offices visited vary in capacity, but generally the staff employed are qualified and diligent. In most project offices visited there was little turnover of technical staff during the project.

Disbursements and Reallocation of Credit Proceeds

8. As of February 8, 1999, the Credit has disbursed SDR 112,156,709.97 (US$ 78,708,620.87 equivalent). This represents 99.8% of the Credit. The Bank received a request from the Ministry of Finance on November 16 to reallocate credit proceeds from the Goods, Consulting Services & Training and Unallocated categories to Civil Works. The Bank reallocated the Credit proceeds as requested before project close on December 31, 1998.

Audit Findings

9. County audit reports in the five provinces (except for Hunan) have been reviewed during the past two missions. County audit reports have in many cases provided good detail on problem areas and areas for improvement, but some have been weak in identifying procurement related problems (see para. 23). The mission requests that the audit discrepancies in Annex 4 for Yunnan and Inner Mongolia's 1997 audit reports be explained or rectified before April 15, 1999. Based on the responses, Association management will decide whether Credit proceeds should be returned to the Association.

D. HEALTH EDUCATION AND SANITATION

Health Education

10. By June 30, 1998, more than 8.1 million people had been trained under the project of which 43% were men, 36% were women and 20% were children. In addition, almost 192,000 people have been trained as trainers and are capable of continuing to spread the health messages generated under the project. The largest group trained for this purpose are community women, totaling more than 127,000.

11. In a Yunnan report, based on sampling interviews and observation, it appears that behavior changes have been significant when compared with baseline survey data. Use of latrine has risen for housewives from 91.6% to 95.2%, and for school-aged children from 43.6% to 85.95%. The incidence of washing hands before eating has risen for housewives from 2.9% to 83.2%, and for school children from 55.7% to 97.5%. Drinking boiled water among housewives has risen from 15.8% to 74.7%, and among school children from 24.8% to 93.39%. As the report realizes, there may be many other factors such as socio-economic development which have played roles in these behavior changes, but nonetheless the project itself did help beneficiaries to

improve their hygiene behavior and sanitation environment. The mission recommends that all project counties and provinces include such survey results in their completion report.

Sanitation

12. Sanitation targets (revised at mid-term) have been exceeded. As of June 30, 1998, latrine coverage has reached 106% of target, animal enclosures have met its target, garbage dumps and drainage canals have exceeded targets. In total, 75 demonstration villages have been completed, which meets the targets set at the mid-term review.

E. FINANCIAL PERFORMANCE

Project Expenditures

13. As of June 30, 1998 project investment totaled Y1,378 million, or 126% of original estimate. Total project investment as of December 31, 1998 is expected to rise to about 150% of the original estimate once the reallocation takes place, and civil works and ICB allocations are finalized. About 88% of project investments have been spent on water supply, to date.

Counterpart Funds

14. As of June 30, 1998 counterpart financing had reached 93% of the revised commitment levels (commitment levels were revised upward by 39% at Mid-term Review). Both Xinjiang and Yunnan have performed very well and have surpassed their targets by 137% and 105%, respectively. Beneficiaries in all provinces have exceeded their planned contributions (both cash and in-kind) by an average of 124%.

Cost Recovery

15. As of June 30, 1998 the Progress Report showed that average water charges did not cover average water costs (O&M and debt service) in Inner Mongolia and Yunnan, and Gansu did not report on the matter. This in combination with the site inspection in Baoshan County, Yunnan, which showed a general problem with cost recovery, especially to cover the debt service, has prompted the mission to seek further clarification on the extent of the problem. After reviewing three sites in Baoshan, the mission concluded that in two cases relatively small tariff increases would be required to meet debt service repayment responsibilities and the third plant would need a more substantial increase to the same level as anticipated for the other plants.

16. During its mission, the team observed three main areas which contribute to the cost recovery difficulties in Yunnan. First, in many instances, facilities were overdesigned. The water consumption estimates used for planning purposes were unrealistically high, and in reality, plants may be operating at only half of their actual capacity. Residents in many areas are still resorting to their original water sources for tasks such as washing their clothes, bathing, and feeding the animals, and using the new improved water for drinking and cooking purposes only. Second, in many areas, there are problems with collection of tariffs. In a number of plants visited during the mission, tariffs were collected only on one-third to one-half of the water actually produced. Inadequate tariff collection appears to stem from two sources: water theft and lapses in collection time. In a number of instances, villagers have determined techniques to obtain water without activating their meters, and using this stolen water to irrigate their fields. Also, there are extended gaps in between collection times in some villages, with the end result that the tariffs are not

collected on water used during this gap period. Finally, a possible third cause of cost recovery difficulties is that beneficiaries do not appear to understand that their new systems were financed through World Bank loans and need to be repaid through tariff collections. This was not explained to them at the time of the systems' construction, nor were initial tariffs set high enough for them to understand this. This may therefore contribute to their willingness to steal water and their poor efforts in tariff collection.

17. The mission requests that Yunnan and Inner Mongolia Autonomous Region Project Offices to report by March 15, 1999 the name of the facilities not meeting cost recovery terms, the number of beneficiaries affected, and whether the plant is currently earning enough through revenues to cover operations and maintenance and a portion of debt service, or whether the revenues don't even cover debt service in an attempt to further clarify the situation.

Financial Management of Water Systems

18. The mission found the quality of financial management to be highly variable atthe water plants which it visited and would recommend further financial training of staff at water plants in both Inner Mongolia and Yunnan. While in some instances, extensive receipts were kept of expenses and tariff collection, in others, staff had poor records and no knowledge of debt repayment obligations. The mission also found one instance in Inner Mongolia of funds for a water plant being kept in a personal bank account, and reminds project offices to notify plant staff that funds must be kept in a separate official bank account. In another case in Yunnan, the bank account statement didn't reconcile with the cash balance (apparently because household meters had been purchased by the water plant to provide to households free of charge to encourage them to return to a metering system). Also, provincial and county project officials should pass on relevant information concerning the schedule of debt repayment to water plant staff in order to better help them assess their financial situation. In Inner Mongolia, water plant account staff were frequently not available and records sometimes locked away.

F. TECHNICAL SUSTAINABILITY

Engineering

19. Design and construction of water supply systems is generally satisfactory. Engineering aspects may impact service sustainability as follows:

- Some system designs may not represent "least cost options". But this applies only to water abstraction and transmission capacity, and is probably not significant vis-à-vis service affordability and willingness-to-pay.
- Apparently optimistic billable water consumption design parameters have resulted in actual operating levels significantly below design capacities. It is probably too early to tell whether this under-utilization is a permanent state and thus a result of system "overdesign".
- Certain "outlier" engineering deficiencies may shorten the service-life of individual water plants, or compromise water quality unless rectified, e.g. improperly installed main meters, well heads not sealed, poor ventilation and drainage at installations, improperly installed household meters.

PPO and CPO Design and Construction Supervision

20. Construction supervision appears to have been adequate. But some sub-project feasibility studies have clearly not evolved appropriate, least cost service options for consumers. This

reflects upon CPOs' design capabilities, and the PPO's supervision performance. This is a key area for improvement in subsequent projects.

Operations and maintenance

21. Water plants are presently delivering a reliable service of clean water to satisfied consumers. But O&M practices and regimes need to be improved to ensure the continuation of these service levels, particularly production monitoring and recording, certain key preventative maintenance procedures, ability to carry out basic repairs, and water disinfection.

Effectiveness of operations and maintenance training

22. O&M training has not yet achieved requisite O&M competencies and incentives amongst water plant operators and managers. More training and constant retraining will be necessary. Water plant staff turnover has been high, particularly amongst accountants.

G. PROCUREMENT

23. In both counties visited the method used for procurement of civil works above the force account limit was not in accordance with World Bank guidelines. In Tuoketuo County non-force account civil works contracts were negotiated and in Baoshan County the Government of China procurement regulations were followed and marking was used. The Bank asked for and received reports from both counties to better determine the effect of the procurement practice used on the final selection of contractor and on the difference of the contract price to that of the engineering design cost. The mission will forward its findings to Bank Management for guidance on whether the procurement practices as constitute misprocurement. Due to these findings the mission has downgraded the project's procurement status from satisfactory to unsatisfactory.

H. FLUORIDE AND ARSENIC CONTAMINATION IN WB-FINANCED INVESTMENTS

24. In Inner Mongolia, fluoride and arsenic are found in many aquifers, often in concentrations exceeding national standards. Annex 3 provides an overview of the current knowledge regarding the occurrence of fluoride and arsenic, and the technological options for their removal.

25. Tuoketuo County is generally considered a "hot spot" for fluoride and, to a lesser extent, for arsenic. Fluoride would occur in different concentrations in different places but be of a county-wide concern, whereas high arsenic concentrations were found in only some of the villages. Not all wells or villages have been analyzed for arsenic as yet, but the (now derelict) shallow wells in Naizegai have arsenic levels that exceed the standards. In addition, ample evidence shows that the shallow wells, which were before the project the means of the rural population to have access to water, had been supplying water with a substantially higher fluoride concentration than the deeper wells that have been installed by the project. The county Anti-Epidemic Disease Station samples all water plants twice annually and follows the development of the fluoride concentration since several years. The record on arsenic is less complete so far. None of the water plants under this project is reported to contain arsenic in levels exceeding national standards.

26. The mission gave particular attention to three water plants containing too high fluoride levels (Yongshengyu, Dabeiyao and Masiyao). Although the CPO believes that the analysis results suggest a gradual deterioration of the fluoride contamination over the past two or three years, the mission rather concluded that the scatter in the analysis results suggests that the trend is not statistically significant.

27. The mission inspected a small filtration pilot plant for fluoride removal based on the "boiled stone" technology of Hohhot University (see Annex 3) in Yongshengyu. Three months of experimenting have been concluded and data are currently being analyzed. If this material proves to be an effective adsorbing medium, the CPO will install full-scale filters in the mentioned water plants. Importantly, the CPO has agreed earlier to not consider installing household-based filters because such decentralized treatment may be less reliable and more costly in view of the fact that the filter's operation does require a minimum of technical capacity and diligent operation. Concern exists about the technical feasibility, the cost, and the institutional complexity of the fluoride removal technologies in rural water supply. This argues against early investment in additional fluoride removal filters.

28. It is recognized that all plants still yield water with some fluoride, of which the concentration in some cases exceeds the standards. However, also in the latter cases the fluoride content of the new water supply is much lower than in the pre-project situation. Because the disease incidence and seriousness are directly proportional to the daily intake of fluoride (and arsenic), it can be concluded that the project has led to a substantial improvement in the quality of the drinking water, and hence, has a positive impact on health. Installing fluoride removal filters, of which the feasibility remains to be demonstrated, has a high opportunity cost as many counties in Inner Mongolia have not yet been equipped with improved water supply. Therefore, the project has been cost-effective.

29. It is recommended that the County Anti-Epidemic Disease Station analyzes the water of the plants on an annual basis only but in a more systematic fashion for both fluoride and arsenic, and that the accuracy of the analyses is improved. An important objective of this monitoring is to detect at an early stage any new leaching of the contaminants from the soils into the wells. Similarly, the efforts to develop a feasible and cheap method for fluoride removal in the rural setting should be stepped up. It is suggested that the World Bank could consider providing financial assistance for this purpose under a subsequent rural water supply loan.

I. INSTITUTIONAL ARRANGEMENTS FOR SUSTAINABILITY OF PROJECT INVESTMENTS

30. The National Project Office has prepared a draft Operational Plan which is in Annex 2.

31. The provincial and county leaders encountered had given considerable thought as to what type of institutional arrangements would safeguard the assets created under the project, provide a channel for loan repayment, provide training and service assistance to water plant staff, and continue the health education initiatives. In previous missions, the Bank had been informed that where budgets permitted counties would like to retain the CPOs, but expand their responsibilities to cover all rural water systems in the county. They would be responsible for new construction but would expand their capacity to focus more on maintenance of the completed systems. During this mission, however, the mission was informed that the Government's personnel reorganization (designed to cut Government staff levels by 40-50%) would mean that CPO's may not be able to

continue to receive Government budget allocations. The two provinces visited stated that they were still reviewing their options, but that converting the CPOs into Rural Water Supply Factories or Companies (RWSCs) was one option they were considering. Apparently, the change of legal status would allow for Government budget support for at least the next couple of years. Other than purchasing spare parts and selling these to the water plants as requested (with no markup), the provincial and county leaders had no intention of charging a "service fee" to provide maintenance and repair services or for training of staff. The mission encourages the CPOs and PPOs to consider charging small service fees soon, so that as Government budgets decline a separate revenue base could be built. In addition, transfer of all fixed assets will be completed by Project Close, with the ownership of most systems residing with village committees or township governments (in the case where a system covers multiple villages). Health intervention initiatives will occur through existing service providers: doctors, women's committees, and through school programs. Bank reviewed with the Borrower international experience of alternative institutional arrangements during the operational phase of the project (see Annex 5).

J. ICR PREPARATION STEPS

32. The mission discussed preparation steps for the ICR in detail with the staff from the NPO. The mission provided NPO with (i) a Chinese version of the World Bank's ICR Preparation Good Practices, and (ii) an outline for the Operational Plan (see Annex 2). The mission requests that the draft of this Operational Plan be provided to the Bank by end mid-March 1999 for its comments, and a final version by end April 1999. By March 15, 1999 the World Bank should supply a draft of the Implementation Completion Report to NPO for its review and comments. By March 15, 1999 NPO should provide a draft of its Evaluation Report to the Bank and its final version by May 15, 1999. The ICR will be published by June 1999.

ANNEX B

ANNEX 1

PERSONS MET

Mr. Chen Huan	Deputy Division Chief, Ministry of Finance
Ms. Hou Yan	Division Chief, State Development and Planning Commission
Mr. Zhang Yiren	Standing Deputy Director, NPO, CRWSSP
Mr. Liu Jiayi	Deputy Director, NPO, CRWSSP
Mr. Luo Fengji	Deputy Division Chief, NPO, CRWSSP
Mr. Shi Risheng	Deputy Division Chief, NPO, CRWSSP
Mr. Zhao Zhenrong	Acting Division Chief, NPO, CRWSSP
Mr. Meng Shuchen	Division Chief, NPO, CRWSSP
Mr. Wang Zhanshe	Interpreter, NPO, CRWSSP

Inner Mongolia Autonomous Region

Mr. Bao Jinsheng	Deputy Director, Autonomous Region Health Bureau
Ms. Li	Division Chief, Autonomous Region Financial Bureau
Ms. Bao Lanman	Project Officer, Autonomous Region Financial Bureau
Mr. Guo Yigang	Director, PPO
Ms. Li Wenhua	Director, Hohhot Project Office
Ms. Guo Yaqin	Accountant, PPO
Mr. Qi Yibin	Accountant, PPO
Mr. Zhang Ziyuna	Project Officer, PPO
Mr. Kou Wenhua	Project Officer, PPO
Ms. Ren Lihua	Interpreter

Tuoketuo County

Mr. Zhao Zhenbing	Magistrate
Mr. Yue Gaohui	Secretary General
Mr. Jiang Shouzhi	Chairman, County People Congress Commission
Mr. Gao Shanfeng	Deputy Magistrate
Mr. Kang Xiaohu	Deputy Magistrate
Mr. Zhai Zhenxiong	Director, CPO
Ms. Ma Yuzhen	Deputy Director
Mr. Liu Guoping	Engineer, CPO
Mr. Li Guanghu	Accountant, CPO
Mr. Fu Lianyao	Project Officer, CPO
Mr. Li Zhenbi	Project Officer, CPO

Yunnan Province

Mr. Yang Chaobin	Deputy Director, Provincial Health Bureau
Mr. Lu Yunsong	Deputy Division Chief, Provincial Development and Planning Commission
Mr. Du Biao	Deputy Division Chief, Provincial Development and Planning Commission
Ms. Lu Xuefan	Project Officer, Provincial Development and Planning Commission
Ms. Shen Fan	Project Officer, Provincial Finance Bureau

Mr. Zhao Hongshen	Acting Director, PPO
Mr. Wan Jixin	Accountant, PPO
Mr. Luo Yanghang	Engineer, PPO
Ms. Yang Xuemei	Accountant, PPO
Mr. Zeng Qingyun	Interpreter

Baoshan County

Mr. Yang Jingjian	Mayor
Mr. Chen Xuefan	Vice Mayor
Mr. Yu Zhiqiu	Director, City Bureau
Mr. Yang Zhengjun	Deputy Director, City Finance Bureau
Mr. Li Jiabin	Project Officer, City Finance Bureau
Mr. Huang Jian	Deputy Director, City Planning Bureau
Mr. Yang Yuhui	Deputy Director, Prefecture Health Bureau
Mr. Gao Zhixian	Director, City Health Bureau
Mr. Yu Yingbo	Deputy Director, City Health Bureau
Mr. Zhao Weidong	Director, CPO
Mr. Zhang Yanglin	Deputy Director, CPO

ANNEX 2

DRAFT OPERATION PLAN

The National Project Office (NPO) conducted a water plant operation survey in December 1998. Based on the survey, NPO thinks all water plants should strengthen operational management and technical assistance because sustainability is critical to this project. In order to better operational performance in the future, NPO drafted the following operation plan:

1. Water plants, in which water supply production hasn't reached full capacity, should strengthen mass mobilization, encouraging local peasants to adopt household connections, so that the water plant's revenue can cover its costs. NPO will coordinate local governments to speed up household connections and increase beneficiaries.

2. In most water plants water is not regarded as a kind of commercial good, which is the key reason why water plant's revenue does not cover their costs. NPO will strengthen training for trainers in order to instill the concept that water is a commercial good. In the meantime, training courses should particularly focus on financial management.

3. Regarding CPOs conversion, there are three options at present. One is to continue the existing CPOs operation if possible. NPO prefers this option because CPOs are very familiar with the project and sustainability can easily be assured if management is strengthened and service levels are improved. Converting the CPOs into Rural Water Supply Factories or Companies is the second option. The last option is to transfer all fixed assets to townships or towns and water plants will be managed and operated by townships or towns.

NPO is considering the conversion and functions of CPOs and water plants as one of the most important matters. NPO will discuss these issues with related agencies and hope they can be solved during the provincial/prefecture and county governments' institutional reform.

ANNEX B

ANNEX 3

FLUORIDE AND ARSENIC CONTAMINATION OF GROUNDWATER IN INNER MONGOLIA

A substantial part of the Inner Mongolia region is known to have groundwater aquifers containing moderate to high concentrations of fluoride. In addition, in specific areas the groundwater also has been reported to contain high concentrations of arsenic.

The region contaminated with fluoride is identified to cover a 60-160 km wide belt that runs west to north-east over a distance of approximately 1,400 km, from west of Linhe to Chifeng and Ulanhot. In shallow groundwater, concentrations can vary from below 0.7 to well above 4 mgF/l. Some areas in this belt are to be considered "hot spots", with a high proportion of the wells (more than 50% of those tested) containing fluoride concentrations of 2-4 mg/l. Among those hot spots are Tuoketuo (Togtoh) County and possibly small parts of adjacent counties.

Five areas are reported to be contaminated with arsenic: a small zone close to Chifeng; a strip of contingent counties including Tuoketuo County, the western part of Helinger (Hohinger) County that borders Tuoketuo County, and Tumd Right-banner (Youqi) County which lies between Tuoketuo County and Guyang County; larger areas in the Bao Meng region (between the Yin Shan mountain range and the Yellow River, around Baotou and Wuyuan); areas west of Bengkou; and some areas on the Loess Plateau across the Yellow River south of Bao Meng. In contrast to the other areas, Chifeng lies some 600 km to the east of Hohhot and is clearly isolated from the other contaminated areas, which all lie to the west of Hohhot. The arsenic contamination near Chifeng is of a very localized nature and is limited to spring water, which suggests a mineralogical origin. The arsenic presence west of Hohhot is of a more diffuse nature and seems associated with both the shallow and deep alluvial sediment layers. Typically, the shallow layers (5-25 m deep) and their groundwater tend to have higher fluoride and arsenic levels than the deeper layers, although this situation may be reverse for particular wells. The JICA study (1997-1998) has compiled data on 16,000 predominantly shallow wells in the Bao Meng area and in Tuoketuo. The highest concentration reported in Bao Meng is 3 mgAs/l, and some 1,600 arsenicosis patients have been identified. Nonetheless, it is recognized that these studies can only be considered as preliminary. A study in three villages in the Hohhot Basin in the early nineties revealed one third of the analyzed shallow and deep wells to contain arsenic levels above the national standard; the prevalence of arsenicosis patients was 5.8%.

The areas with high fluoride and high arsenic levels overlap to a limited degree, but it is clear that fluoride is more widespread.

The geological complexity of the sediment deposits in the region strongly suggests that very localized geo-hydrological phenomena can occur, although it seems practical and reasonable to describe the average groundwater contamination situation for planning purposes on a scale of a county. The heterogeneity of the sediments is borne out, for instance, by the fact that in Tuoketuo County quite a number of artesian wells can be found, whilst neighboring villages have much deeper water tables of -20 or 30 m.

National drinking water standards define the maximally allowable level of fluoride in rural water supplies at 1.5 mgF/l ("Grade III quality", or poorest allowable quality), which exceeds the 1.0 mg/l level applicable to urban supplies. The maximum for arsenic is 0.050

mgAs/l, which corresponds to the maximum allowable concentration set by the World Health Organization (the WHO recently set the maximum advisable concentration at 0.010mg/l).

Physico-chemical technologies to remove fluoride from water are available and have been demonstrated to be feasible. These technologies are often based on filters containing ion exchange resins or inorganic adsorbants (such as calcium oxide, phosphate, and/or alumina). Removal of arsenic, on the other hand, is less obvious, and few technologies are currently available that are easy to operate and maintain. However, all these technologies tend to be rather expensive and require a higher degree of technical and management capacity from the operator. Although feasible for larger-scale urban water supply, there is no straightforward removal technology option available for the small-scale rural operations under the projects' purview. Presently, the Chemical Department, Hohhot University (Prof. Li Tu Xing), conducts experiments for fluoride removal at field level with a pilot plant using "boiled stone" (composition as yet not communicated to the mission) that is mined from a location 60 km from Hohhot. If proven to be technically and institutionally feasible, this option may also be sufficiently cheap. It is estimated that the depreciation and O&M cost would amount to 0.2-0.3 Y/m^3, which is typically 10-20% of the total cost for a regular plant without the fluoride removal. This cost could still be carried by most of the consumers. However, for arsenic, no removal options are currently available that are both cost effective and technically feasible under rural conditions. The National Project Office is not considering arsenic removal technologies, beside the option of searching for a well location or a well depth that yields safe water.

References

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Luo Zhen-dong, Zhang Yu-min, Ma Liang, Zhang Ge-you, He Xingzhou, Wilson R., Byrd D., Griffiths J., Lai Shenghan, He Lili, Grumski K., and Lamm S.H. Chronic Arsenicism and Skin Cancer in Inner Mongolia – Consequences of Arsenic in Well Water. *Proc. SEGH Meeting*, San Diego, CA, 1995.

The 1995 report by the Hohhot Sanitation and Anti-epidemic Disease Institute Preliminary, and results of a JICA sponsored study (1997-1998) (information conveyed by Prof. Li Sumei, Director. It should be noted, however, that the mission did not have the opportunity to directly talk to members of the JICA study team).

Analysis results of well water compiled by the Tuoketuo County Anti-Epidemic Disease Station.

Notes of a discussion with Mr. Liu Jiayi, Deputy director, National Project Office, National Patriotic Health Campaign, Beijing, May 15, 1998.

ANNEX B

ANNEX 4

AUDITING IRREGULARITIES (1997 AUDIT)

Inner Mongolia Autonomous Region

Inner Mongolia PPO:
1. In September, 1997, PPO lent RMB 100,000 to non-project office; as of today, not repaid.
2. In December, 1997, PPO lent RMB 25,000 to Foreign Economy Division, Inner Mongolia Financial Bureau; as of today, not repaid.

LinXi CPO
1. RMB 9,980.38 improper expenditure;
2. RMB 99,883.99 account receivable to be deferred;

Hohhot City Project Office:
1. "IOU" materials value reached RMB 104,600;
2. RMB 265,100 worth of materials and pumps were recorded in red ;
Accumulated intercompany account reached 661,400; and other accumulated account receivable reached 61,800. All of these were private borrowing.

Tuzuoqi CPO
1. Illegal expenditure reached RMB 104,100.
2. RMB 4,900 management fee was over withdrawn; RMB 3,100 commitment fee was over withdrawn.

Tuoketuo CPO:
1. In the audit report, it mentioned that some problems were found but not sorted out.

Yunnan Province

Chuxiong City Project Office
1. RMB 419,728.28 worth of materials lost;
2. RMB 73,000 counterpart fund appropriated from beneficiaries could not be used for the project. Among which RMB 5,000 was held by Fayi Office; RMB 23,000 of the fund was used to construct office building by Ziwu Water Management Station.

Qiaojia CPO
1. RMB 73,189.28 field survey and exploration cost without formal invoice

Yunxian CPO
1. RMB 76,000 provision for debt service were diverted to repay the revolving fund to the Financial Bureau.

Mile CPO
1. Some financial accounts could not be recorded properly.

Baoshan CPO

1. Due to poor management , water tariff collection in some of water plants could not cover staff's salary. Such as, Xinguanghe Water Plant.
2. RMB 365,000 project fund were used for office building and dormitory construction.

ANNEX 5

ALTERNATIVE INSTITUTIONAL ARRANGEMENTS FOR OPERATIONAL PLAN

WORLD BANK ADVICE TO BORROWERS

A. INSTITUTIONAL OPTIONS

1. Two guiding principles

Examples of umbrella service organizations successfully and sustainably "intermediating" between their "client" water supply and sanitation (WSS) system owners/operators and commercial service providers[1] seem to present at least two common "guiding principles". They are linked, and not surprisingly relate directly to incentives for efficient and effective value adding:

- Competition: Regulatory and subsidy arrangements should not unreasonably obstruct fair and open competition in the service market.
- Commercial viability: Positive cash flows are the best assurance of sustainability of service provision.

2. County Rural Water Supply and Sanitation Company

During the World Bank's RWSS II Implementation Completion Mission (ICM) in November/December 1998, provincial and county project officers suggested the "*County Rural Water Supply and Sanitation Company*" (Coys) as one possible institutional option for ensuring the sustainable delivery of WSS services after project implementation. The model described by different officers had certain key commonalities:

- Re-tooled County Project Offices (CPOs): The coys would essentially be the CPOs but with different mandates delivering different services -- from project implementation to operational support.
- With some ongoing National government funding support: Given the long and "laudable" history of National government social welfare support in China, some continuing level of on-going government subsidy for the coys was argued to be both necessary and desirable. There was no definitive discussion on a notional schedule or mechanism for phasing out this support.

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[1] The *PROSANEAR* urban environmental sanitation program in Brazil rests, inter alia, on the successful operational phase intermediation between poor communities and market service providers. Although the market and the services are somewhat different, the concept is directly relevant for RWSS II. The *Water and Sewerage Construction Company* (WASECO) in Ho Chi Minh City in Vietnam provides an interesting example of operational phase technical and management support, including training of local operators ahead of the transfer of assets. In the Philippines, the AusAID -assisted *Central Visayas Water and Sanitation Project* has been followed up with a Federation of WSS service co-operatives established through the project, across the four participating provinces (each about the size of a typical county in China).

- Providing a range of operational support services: The mission and project officers discussed the range of service which might be properly provided by these coys, including training, bulk procurement of spare parts and system expansion materials and equipment, operations and maintenance advice, technical repairs, and financial management assistance including collection and bundling of IDA credit repayments.
- Partially on a commercial basis: Project officers acknowledged that some of these services should be provided on a commercial basis, and could therefore generate an independent cash flow for the coys, especially the supply of spares, goods and materials.

3. Compliance with the "guiding principles"

The notion of an umbrella organization serving project-initiated small WSS system operators is conceptually sound; and the model explained by the Bank's interlocutors may be reasonable for the project counties at this time. However, the model suffers two potentially fatal deficiencies:

- Net negative cash flows: The model assumes that government subsidies will be necessary, *ad infinitum*. In this sense, the proponents see the coy as a CPO, but who's function is to deliver government sponsored operational support instead of implementation support. Even if government were to accept this arrangement initially, its policy on subsidies would inevitably change, the public benefactor will disappear, and with it the bankrupt coy. Some level of government subsidy during a defined transition phase may or may not be necessary and wise. But whatever the arrangement, **no services should be offered to the WSS system operators on less than a commercial basis unless for commercial strategic reasons** (e.g. a deliberate loss-leader position to establish a sub-market). A positive cash flow is any organization's best guarantee of survival.
- Market distorting subsidies: Any government subsidy for the coy will distort the market for providing those services, potentially disqualifying more suitable contenders, and downgrading the quality of service. It may be, for instance, that pre-existing county town water supply companies would be more competitive in providing some or all of the services envisaged. It is conceptually incorrect to assume that the CPOs are best placed to provide these services. **No subsidy arrangement should disqualify potential commercial competitors**. Open and fair competition ultimately maximizes customer satisfaction and continued demand for those services.

4. Some variations and lessons learned

Umbrella company owned by the WSS system operators: The coy. may be owned by the system operators who have subscribed for stock in the coy. This underpins the relationship between the CVWSP WSS cooperatives and their Service Federation in the Philippines (see footnote 1). The Federation's shareholders are the WSS cooperatives who have subscribed Pesos 150,000 to establish the Federation's capital base. There is no government support or interference, and the WSS cooperatives have total discretion over their dealings with the Federation. Each has an absolute interest in the well-being of the

other. But it is too soon to draw conclusive lessons from this experience; and it suffers the same anti-competition risks suffered by any vertically integrated conglomerate.

Integration of project implementation and project operation; and project replication: In the successful WASECO example in Vietnam, the company packages each project as a small-scale *build-operate-transfer* scheme. After signing a service contract with a participating commune, WASECO borrows funds from local banks to finance construction. The coy. then operates the system and charges an agreed tariff, for five to seven years. Tariffs are always sufficient for full cost recovery. Households pay the full cost of connections from the street to the house. Following construction, the coy. provides training for local system operators to ensure operation sustainability after transfer of assets.

There are three important lessons for RWSS II:

- The importance of full cost recovery and the advantages of engendering fiscal and commercial discipline from the start of the operations phase;
- As an example of how to replicate the project to other villages, and the potential for expanding the coy's immediate scope of services and its eventual service market; and
- An example of a government-owned company -- WASECO -- locking in a viable long-term future.

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STAFF APPRAISAL REPORT

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

JANUARY 9, 1992

Environment, Human Resources and
Urban Development Operations Division
Country Department II (China and Mongolia)
East Asia and Pacific Regional Office

CURRENCY AND EQUIVALENT UNITS
(as of May 1991)

Renminbi (RMB) Yuan (Y) 1.00 = 100 fen
US$1.00 = Y 5.31

WEIGHTS AND MEASURES

meter (m)	=	3.28 feet
kilometer (km)	=	0.62 miles
liter (l)	=	0.264 US gallons
lpcd	=	liters per capita per day
cubic meter (m3) or ton of water	=	284 US gallons

ABBREVIATIONS AND ACRONYMS

CPO	-	County Project Office
CRWSTC	-	China Rural Water Supply Technical Center
EEC	-	European Economic Community
ICB	-	International Competitive Bidding
LCB	-	Local Competitive Bidding
MOF	-	Ministry of Finance
MOPH	-	Ministry of Public Health
NPHCC	-	National Patriotic Health Campaign Committee
NPHCCO	-	Executive Office of the NPHCC
NPO	-	National Project Office
PPO	-	Provincial Project Office
RWS	-	Rural Water Supply Project (Cr. 1578)
RWSS	-	Rural Water Supply and Sanitation Project
UNDP	-	United Nations Development Programme
UNDP/WB	-	The UNDP/World Bank Water and Sanitation Program
WHO	-	World Health Organization
Gansu	-	Gansu Province
Guangxi	-	Guangxi Zhuang Autonomous Region
Hunan	-	Hunan Province
Neimong	-	Nei Mongol (Inner Mongolia) Autonomous Region
Xinjiang	-	Xinjiang Uygur Autonomous Region
Yunnan	-	Yunnan Province

GLOSSARY

Province - China is divided into 23 provinces, five autonomous regions and three municipalities. In this report, the term "province" refers to provinces and autonomous regions.

County - Chinese provinces/autonomous regions are subdivided into counties, cities, banners and branches. In this report, the term "county" refers to all of the afore-mentioned.

FISCAL YEAR

January 1 - December 31

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

CREDIT AND PROJECT SUMMARY

Borrower: People's Republic of China

Beneficiaries: The six project provinces of Guangxi, Yunnan, Hunan, Gansu, Nei Mongol and Xinjiang

Amount: SDR 78.9 million (US$110.0 million equivalent)

Terms: Standard IDA terms with 35 years maturity

Onlending Terms: From the Government of China to project provinces: 20 years including five years grace at fixed annual interest of two percent for the foreign exchange portion and four percent for the local currency portion. From the provinces to sub-project entities through project counties: maximum 20 years including up to five years grace at fixed interest of four percent per annum. Foreign exchange risk would be borne by the provinces.

Project Description: The project would serve about nine million rural inhabitants of 75 poor and water-scarce counties in six under-developed inland provinces. It would comprise five components: (a) construction of water supply facilities; (b) construction of sanitation facilities in selected demonstration and pilot villages; (c) provision of health and hygiene education; (d) technical assistance and training at national and local levels; and (e) construction and equipping of project management offices. Through project preparation and implementation, immediate objectives are to: (a) develop long-term strategies to prioritize investments at the county level; (b) develop affordable and sustainable programs to maximize project impact; (c) establish and maintain properly staffed institutions and provide technical assistance and training to support adoption, implementation and operation of such programs; (d) increase coverage in water supply, sanitation and health/hygiene education; and (e) enhance replicability of project activities through development of models, standards and manuals as well as dissemination of experience and lessons learned.

Project Benefits: The project is expected to alleviate human suffering associated with poverty and ill health and improve quality of life. It would reduce morbidity which is costly in terms of productive time loss and medical expenses. Through improved access to basic levels of water supply, time and energy saved on water collection would be spent on child and elderly care and productive activities. By bringing about improved sanitation services and hygienic

practices, the project is also likely to have substantial health benefits in disease reduction. In terms of institutional development, the project would enhance community participation and bring together sectoral organizations to work in a coordinated fashion. Capacity building in technical and managerial skills and development of workable long-term investment plans would also ensure successful project execution and sustained sector growth.

Project Risks: Shortage of qualified personnel in project management and implementation might hamper progress. The country's policy on self-reliance and cost recovery concerns might block poor communities from participating and limit investment in the sanitation and health education components. The project addresses these risks by: (a) strengthening management and provision of technical assistance and training for all implementing agencies; (b) production and dissemination of "user-friendly" manuals; (c) establishment of review criteria for sub-project selection; (d) promoting community participation, including women, and commitment from the start and through every stage of sub-project planning and implementation; and (e) development of long-term strategies and sustainable investment programs for sanitation and health/hygiene education.

Estimated Costs:

	Local	Foreign	Total
	-----	(US$ Million)	-----
Water Supply Construction	60.1	60.8	120.9
Sanitation Construction	5.9	--	5.9
Health and Hygiene Education	4.3	1.8	6.1
Technical Assistance and Training	5.1	1.6	6.6
Institution Establishment & Proj. Mgmt.	4.9	1.2	6.1
Total Base Cost	80.2	65.4	145.7
Physical Contingencies	8.0	6.5	14.6
Price Contingencies	15.9	13.0	28.9
Total Project Cost[1]	104.2	84.9	189.1

[1] Project-financed goods are exempted from import duties and taxes.

Financing Plan:

	Local	Foreign	Total
	-----	(US$ Million)	-----
Provinces & Prefectures	23.0	--	23.0
Counties & Townships	18.9	--	18.9
Communities and Individuals	37.2	--	37.2
IDA	25.1	84.9	110.0
Total	104.2	84.9	189.1

Estimated Disbursements:

IDA FY	1992	1993	1994	1995	1996	1997	1998
	----------	----------	----------	(US$ Million)	----------	----------	----------
Annual	7.0	19.0	25.0	25.0	18.0	13.0	3.0
Cumulative	7.0	26.0	51.0	76.0	94.0	107.0	110.0

Economic Rate of Return: Not applicable

Note: Figures may not total exactly due to rounding.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

STAFF APPRAISAL REPORT

Table of Contents

This report is based on the findings of an appraisal mission to China in May-June 1991. Mission members comprised Ivy H. Cheng (Task Manager, Financial Analyst), Erdogan Pancaroglu (Sanitary Engineer), Andrew Macoun (Sanitation Engineer), Herbert Boehm (Health Education Specialist), Leon Miller (Economist) and Florencio Padernal (Consultant, Sanitary Engineer). Peer Reviewers were John Huang (Sanitary Engineer, EA2EH), Arthur Bruestle (Environmental Engineer, ASTEN), Ayse Kudat (Sociologist, INUWS), Eugene Boostrom (Public Health Specialist, AFTPN) and Gerhard Tschannerl (Municipal Engineer, AF2IN). Division Chief is Zafer Ecevit and Department Director is Shahid Javed Burki.

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CHINA

RURAL WATER SUPPLY AND SANITATION[1] PROJECT

STAFF APPRAISAL REPORT

I. THE RURAL WATER SUPPLY AND SANITATION SECTOR

A. Sector[2] Background

1.1 The lives of China's 900 million rural inhabitants have improved markedly since 1949. There have been major gains in health, housing, agricultural productivity and economic conditions. Health improvements have resulted largely from better primary health care including health education campaigns, improved nutrition, better maternal and child care, immunization, and improvements in drinking water and sanitation facilities. Nevertheless, at the end of 1990, about 70 percent of the total rural population was still inadequately served with water supply. More than 90 percent did not have means of proper sanitation, and unhygienic practices in the use of nightsoil in agriculture are widespread. Health and hygiene education is also limited. As a result, rural areas are still plagued by dysentery, hepatitis, typhoid and cholera epidemics, and above all, common diarrheal diseases and helminth infections, all of which are clearly linked to poor water supply, sanitation and health/hygiene education. The conditions tend to be worse in the poorer and more remote areas of the country where development of the sector has lagged behind.

1.2 Water Supply. At the end of the International Drinking Water Supply and Sanitation Decade (1981-1990), statistics indicate that about two-thirds of the rural population still relied on traditional sources such as open-dug wells, shallow wells with handpumps, rainwater collectors, water fetched from rivers, undeveloped springs or ponds of doubtful quality. Approximately one third had critical water supply needs: 45 million consumed water with excessive fluoride; 63 million drank saline or alkaline water; 150 million used untreated surface water contaminated by domestic, industrial or agro-chemical wastes; and 42 million lived in water-scarce areas.

1.3 Of the total rural population that is adequately served, over 80 percent get their water through piped systems. Although construction costs per person for these systems are generally higher than point source facilities, they are usually preferred when financing could be arranged because the technology is regarded as reliable, convenient and easy to operate and maintain, as well as being superior in quality. Some regional

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[1] In the context of the proposed project, sanitation refers to physical facilities as well as the promotion of hygiene and prevention of disease by achieving and maintaining sanitary conditions.

[2] In the context of this report, sector covers the rural water supply, rural sanitation and rural health and hygiene education sub-sectors.

(multi-village and even cross-county) schemes have also been adopted to achieve efficiency and economy of scale.

1.4 Sanitation. Detailed statistics on sanitation coverage are not available but it is known that up to 90 percent of the rural population has access to simple household latrines. However, these facilities could be described as rudimentary at best: they are temporary storage of wastes and provide easy access to flies and other insect vectors of disease transmission. The availability of public and school latrines is low, and their standard is also poor. Wastes are collected and transported to the fields for use in agriculture, often without further treatment. These practices are traditional and will undoubtedly continue. The main objectives of sanitation improvements are therefore to improve the standard of latrines and to make re-use practices more hygienic.

1.5 Poor disposal of human wastes is the greatest but by no means the only sanitation deficiency. Wastewater is discharged at will, drainage is poor, and most rural households keep pigs and other animals in their compounds, often without proper enclosures. Animal manure is deposited indiscriminately, further exacerbating unsanitary conditions.

1.6 Health Education. Health education in rural areas is very limited, consisting only of the provision of textbooks to most of the primary students, the distribution of some hygiene information to herdsmen, the production of a few television and radio programs, and in rare cases the publication of bulletins and newspapers. Little effort has been made to develop and disseminate culturally appropriate materials for minorities and to use non-conventional instruments for the illiterates.

1.7 Activities in the provincial and the recently established district health education institutions are often carried out on an ad hoc basis by personnel who are in the majority doctors, not health education specialists. To overcome this problem, some provinces have initiated specific programs for health educators at medical universities, but most provinces still lack such specialized training.

B. Sector Organization

1.8 The national coordination responsibility for improvement of rural water supply, sanitation and health education lies with the National Patriotic Health Campaign Committee (NPHCC). The Committee is composed of senior officials from over forty ministries and central agencies active in planning, finance, health, water resources, environment, construction and material allocation matters. The agency's objectives are health promotion and disease prevention through organized mass participation. Day-to-day work of the Committee is delegated to the Executive Office of the National Patriotic Health Campaign Committee (NPHCCO). Corresponding committees and offices exist at the provincial, prefecture and county levels. As at the center, the local committees provide inter-sectoral coordination while the local offices, usually under the local health bureaus of the Ministry of

Public Health (MOPH) are responsible for implementing NPHCC's policies and priorities.

1.9 Planning, development and operation of the sector are generally carried out at the local levels (county level and below) where expertise and resources are both limited. Physical construction is mostly carried out by local construction units and communities.

C. Demand for Services

1.10 At the highest level, the Government recognizes the need to improve the water supply, sanitation and health/hygiene education sub-sectors in parallel in order to reduce incidence of water-borne and sanitation related diseases. This theme was reiterated during the recent Second Rural Water Supply Conference chaired by the Minister of Public Health in December 1991. However, this integrated approach is not yet well understood and accepted by most local government officials, civic leaders and rural families. They generally still regard improvements in water supply as by far the most important among the sub-sectors. This can be demonstrated by reviewing development records and the willingness of local government and users to contribute to water supply construction.

1.11 Demand for sanitation services is complex. On the one hand, utilization of human wastes as fertilizer/soil conditioner is common place and is a factor in generating agricultural income. Any improvement in the convenience of storing and treating wastes, or in the quality of wastes produced, is likely to result in strong demand[3]. However, recognition of the health consequences of poor sanitation is not widespread and it must be anticipated that demand for improvements on grounds of health improvement will take time to develop and will need to be stimulated.

D. Planning and Investment Programs

1.12 So far, service coverage targets as stated in the Government's Five-Year Plan and NPHCC's Ten-Year Programs have dominated sectoral planning. Little attention has yet been given to development approaches, in particular community participation in the planning and implementation process, and requirements in financing, operation and maintenance.

1.13 Water Supply. A national rural water supply program with a target to provide safe drinking water to all by 1990 was initiated in 1981 in response to the International Drinking Water Supply and Sanitation Decade Program. In 1985, the Government announced its revised target to adequately serve 80 percent of its rural population by the end of the decade. At the end of 1990, about 75 percent of the population's water

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[3] This was the experience with past government programs to promote biogas generators - several million units were built and they have remained popular, despite high failure rates due to poor quality materials and construction.

supply had been improved to various extent and about 31 percent were served by piped systems. Still, of the total, only about 30 percent was considered adequately served (para. 1.1). Further targets have been included in later plans: by 1995 - 85 percent with improved supply including 30 to 40 percent served by piped systems and 35 to 50 percent meeting water quality standards; by 2000 - 90 percent with improved supply including 35 to 50 percent served by piped systems and 45 to 60 percent meeting water quality standards. Recently quality standards for rural water supply have been developed; however, clear definition has yet to be given to the term "improved supply". Actual expenditures for the five year periods 1981-1985 and 1986-1990 were RMB Y3.25 billion and Y9.43 billion respectively.

1.14 Sanitation. No comprehensive rural sanitation improvement programs have yet been implemented in China. In the past, biogas plants have been actively promoted for the co-digestion of animal and human wastes although the programs were driven mainly by energy and agricultural considerations. More recently the NPHCC launched a pilot sanitation project in ten counties and two minority regions to test latrine types and nightsoil treatment.

1.15 Targets set for sanitation service coverage are: latrines for 20-50 percent of the rural population by 1995 rising to 35-80 percent by the year 2000, depending on local economic conditions. In addition, active programs are planned to promote the treatment of nightsoil to render it harmless. Sanitation programs will target model villages and townships to reach an advanced standard of sanitation so that these communities can serve as examples to others in their vicinity. Based on local economic conditions, coverage targets are: 10-15 percent of villages, 3-6 percent of townships by 1995; 20-40 percent of villages, 10-25 percent of townships by the year 2000.

1.16 Health and Hygiene Education. Key targets set for 1995 include: health education institutes in 50-70 percent of counties, 30 health education workers per million population, 30-40 percent of rural schools offering hygiene education courses and 30-50 percent of rural population practicing proper hygiene habits. Corresponding targets for the year 2000 are 75-80 percent of counties, 50 workers per million, 80 percent of schools and over 50 percent practicing proper hygiene habits.

E. Financing

1.17 The virtual absence of direct central government financing for the rural water supply and sanitation sector distinguishes China from most other developing countries. Capital costs for water supply are partially provided by local governments at the provincial, prefecture and county levels but to a large extent they are met by contributions from communities, rural enterprises and household users. During the 1980s, total investment in the sub-sector amounted to RMB Y12.3 billion. Of the total, about ten percent was contributed by provinces and counties, 40 percent by township/village governments and rural enterprises and the

remaining 50 percent by user communities and households. Consumers almost always pay the recurrent costs. Water charges normally cover the cost of operations and maintenance, and sometimes depreciation or debt service. Capital costs for public and communal sanitation facilities are met by the local governments. Household latrines are privately built with little or no subsidy from the government. Expenditures on health and hygiene education are covered by provincial and local budgets. They are well below targets recommended by the World Health Organization (WHO). In many districts, only notional amounts are made available in their budgets and funds are often provided only for personnel expenditures.

F. Issues and Constraints

1.18 Despite the progress made, a number of issues and constraints still impede the development and performance of the sector.

1.19 Overall Sector Planning. The fundamental problem of the sector is the lack of coordinated planning and investment programs at the national as well as local levels. The service coverage targets reflected in national plans (paras. 1.12-1.16) in most cases have never been translated into concrete and realistic investment strategies and plans at the provincial, county and township levels, which are the prime movers for development, both in terms of initiative and financing.

1.20 Funding and Financing Arrangements. The availability of funds is often cited as the main reason for the sector to fall short of attaining its targets. As a result of the Government's policy of self-reliance, local governments, communities and households are expected to pay a substantial part and sometimes full cost of service. This policy, although considered to be appropriate in more affluent regions, often inhibits reasonable development in poor segments of the society. The exact situation is still unclear as little is known about actual demand and the capability of local governments to adopt a demand-driven approach and to fund long-term development programs. No sound study has been conducted on water pricing, willingness to pay and appropriate methods for billing and collection in the rural setting. Under the present compensation system, rural doctors are limiting their services primarily to the provision of curative care. Health education is no longer provided routinely. Without seed capital, appropriate financing mechanism and practices to enhance replicability it is difficult for the sector to advance rapidly.

1.21 Institutional Framework. Under the current institutional arrangement at the national level, communication and collaboration between the National Project Office (NPO) and other sub-sectoral units in NPHCCO, MOPH, design institutes, health education institutes, training organizations etc. would be crucial to the long-term development of the sector. At the local level, the self-reliance policy has placed the main responsibility of development on the township/village governments. These governmental organizations and communities, however, often lack the administrative, financial and technical skills and experience to design, plan, construct, operate and maintain physical facilities and to design and

carry out effective health education campaigns. Most school teachers are poorly trained in hygiene and health subjects and therefore do not have the knowledge to effectively shape or change tne hygiene habits of children. The problem is particularly acute in the less developed inland areas where the level of illiteracy is high and social and cultural differences of ethnic minorities require diverse approaches.

1.22 Technical Considerations. Despite some progress in certain regions, China's exposure to and experience with recently developed and developing low-cost water supply and sanitation technologies is still limited due to its unfamiliarity with practices in other countries, insufficient communication among provinces and restricted labor mobility. As a result, designs and standards are sometimes inappropriate and inefficient. The lack of low-cost alternatives in some areas also delayed development because of affordability concerns. A design manual for non-piped technologies is only currently under preparation to supplement the existing design manual for piped systems developed under the first Rural Water Supply Project (RWS) (para. 1.29).

1.23 In some regions where surface water is inadequate to meet demand, especially during the winter, and natural ground water quality is poor, specialized treatments of ground water such as defluoridation may be required. The effectiveness of existing technologies are often controversial and their use expensive. Development of rural industries in the past decade has caused widespread contamination of water sources. Pollution control measures and selection of appropriate technologies for treatment and removal of pollutants need to be considered and improved.

1.24 Except for well managed piped schemes, water quality testing, monitoring and control in the rural areas are often neglected. The situation is more serious where small schemes and point-source supplies are concerned. Urban water quality standards, the only set of drinking water standards approved by the government, are rarely met or enforced in rural areas for various technical, personnel and cost reasons. Only very recently (1991) have actions been taken to establish a set of more realistic drinking water standards for rural water supply.

1.25 Development of standards and guidelines for sanitation has only started recently. Based on the experience of its pilot programs (para. 1.14), NPHCCO has compiled "Selected Drawings on Rural Latrines and Sanitary Nightsoil Treatment Facilities in China's Rural Areas" in 1991. MOPH in 1987 issued National Standard for the Non-hazardous Treatment of Nightsoil for application to collected nightsoil treated by high-temperature composting or anaerobic digestion. A comprehensive set of standards for household latrines is still under preparation.

1.26 Human waste collection and use in agriculture is a long-standing practice which occurs on a very large scale, although less so in the sparsely populated and drier western provinces. Latrines are widespread but rudimentary or of unsatisfactory design, and the practices of waste

collection and use are far from hygienic. Improvements in these practices are needed to ensure the safe use and disposal of human wastes.

1.27 Program Approach. Achievement of sectoral targets set by the Government would require sustained efforts over extended periods of time. Particularly for the sanitation and health/hygiene education sub-sectors, a program approach which will allow efforts to continue and expand in future to achieve significant and sustained progress is required. A project approach with limited time and financing is unlikely to build long-term capacity.

G. The Bank Group's Role and Sector Lending Experience

1.28 The Bank Group's role in the sector is to assist the Government in addressing the sectoral issues and constraints through the provision of financial and technical support. The Bank's experience has enabled it to assist the Government to develop a well-conceived institutional framework and strategies for the sector. In the future, the Bank Group's assistance will focus on the provision of services to the rural population of poor and remote areas. It will continue to bring about improvements in institutional capacities, particularly in overall planning, adoption of alternative appropriate low-cost technologies, and integration of physical construction of water supply and sanitation facilities with related health and hygiene education programs.

1.29 The Bank Group's involvement in the sector started in 1982. The first Rural Water Supply Project (RWS) (Cr. 1578-CHA for US$80 million equivalent or SDR 82.1 million), approved in 1985, was designed to provide safe drinking water to some six million rural inhabitants in the four relatively well-off provinces of Zhejiang, Sichuan, Liaoning and Shaanxi and the Municipality of Beijing. Technical assistance, institutional development and training were included as components of the project. The physical implementation is now complete. Design, construction and operation and maintenance manuals primarily for piped water supply systems have been published and disseminated in an effort to standardize and provide guidance to the development of the sub-sector. Experience with and benefits of competitive procurement have also been gained. Where sub-projects are operational, statistics on improved livelihood have been very encouraging. The credit was closed at the end of 1991.

H. Lessons Learned

1.30 Although a Project Completion Report (PCR) has not yet been prepared for RWS, a number of lessons have been drawn from the experience. The main lessons learned have been integrated into the design of the proposed Rural Water Supply and Sanitation Project (RWSS).

1.31 Integration of Rural Water Supply, Sanitation and Health/Hygiene Education. It was observed that although water supply improvements were the most in demand, health improvements would only be maximized if complementary improvements in sanitation services and health/hygiene

education were provided as integral parts of the undertaking. The key difference between RWS and the proposed project is the inclusion of the two complementary components.

1.32 Institutional Development. At the project offices, management systems such as planning, monitoring and data management were set-up and applied. Institutional processes (such as meetings with prospective beneficiaries on construction cost sharing and water charges) were developed. Training and capacity building activities were instituted and had served project personnel and communities. ICB procedures for procurement of materials and LCB procedures for civil works resulted in very competitive prices. These initiatives were all well received and considered very positive aspects of RWS.

1.33 Investment Planning. The project completion date of RWS has been extended for one year in order to accommodate the re-design, approval and construction of larger systems to replace small isolated village systems originally planned. This was done to attain economy of scale and to include villages which were reluctant to participate at the beginning but changed their position after witnessing apparent economic growth and health improvements of neighboring project villages. Planning of RWSS is being done in a more programmatic fashion, i.e. it will be refined and reviewed on an annual basis to be more responsive to shifting demands.

1.34 Coordination of Project Activities. It was observed that inappropriate packaging of ICB contracts often resulted in long delays in construction of sub-projects under RWS. Under RWSS, measures would be taken to ensure early preparation of ICB procurement documents and to better coordinate procurement so that implementation requirements and schedules are met. Where justified, LCB and local shopping would be allowed for procurement of urgently needed materials in small quantities.

1.35 Criteria for Sub-project Design Review. A substantial percentage of sub-projects under RWS were constructed without prior approval of designs by the national project office as agreed. The long waiting period for approval due to considerable backlog was cited as the main reason for non-compliance. Thresholds for review of sub-project designs though originally set at reasonable levels became unrealistic due to much higher than expected domestic inflation over the project implementation period. To avoid overloading the provincial and national project offices in the future, thresholds for review would be adjusted for inflation periodically.

1.36 Sub-project Design. It was noted that many completed sub-projects, though generally well constructed and operated, were over-designed. In the selection of water treatment technology, it was also observed that cost effectiveness would be improved with more thorough analysis of alternatives. These matters would be more closely monitored during implementation and supervision of RWSS.

1.37 Provincial Revolving Funds. Under RWS, it was expected that the difference in repayment terms of provincial loans to villages (ten years with two years grace) and Government loans to provinces (25 years with ten years grace) would allow substantial funds to build up in provincial revolving funds. As a result of wide-spread delays in project implementation and slower than expected capital cost recovery, the originally envisaged benefits will not be fully realized. Taking into account the harder on-lending terms from the Government to the provinces (from zero interest and 25 years maturity with ten years grace to four percent interest and 20 years maturity with five years grace), and financial capability of the targeted communities, it was decided that revolving funds would not be established for the proposed project[4].

1.38 Maintenance of Project Offices. Concerns were expressed, particularly by county project officials, that project offices would be dissolved at the completion of RWS as most of them were set-up at the start of the project to be the "RWS project offices". In order to sustain the momentum already created in project areas, provide continual support to existing and future local water companies, and enhance replication capacities, project offices should be maintained on a long-term basis.

1.39 Community Management. Community participation is seen as a necessary element if sustainability is to be achieved. Although cost recovery, community ownership, responsibility for operation and maintenance have been emphasized and achieved to a large extent under RWS, local involvement in the planning stages and community empowerment including women have been deficient. RWSS would continue to address this issue through formulation and review of strategies and provision of technical assistance and training.

1.40 Water Quality Standards and Control. Under RWS, though water quality is not perceived as a problem, water supplied often times is not expected to and does not fully meet the rather stringent standards (para. 1.24). The lack of an appropriate set of standards for rural drinking water made quality monitoring somewhat arbitrary and gathering of statistical information difficult. During RWSS preparation, a set of guidelines for rural drinking water quality was developed. This was later reviewed by the United Nations Development Programme (UNDP) and WHO and endorsed by NPHCCO for dissemination.

1.41 Procurement of Locally Produced Goods and Equipment. Under RWS, all major categories of goods and equipment were procured through ICB. For certain items such as cement and timber which were available locally in abundance and at low prices, all bids were won by local suppliers. Two issues were raised: merit of ICB for such items; and time/cost involved in cross-country transportation. Under RWSS, some standard items that are

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[4] Revolving funds may be established for future locally financed sanitation programs as required by the financing and cost recovery proposals to be prepared.

readily available in China and which no foreign firm would have a competitive advantage would be procured locally and provided by the civil works contractors (para. 3.25).

1.42 Lessons Learned from the Low-cost Rural Water Supply and Sanitation Project under the UNDP/World Bank Water and Sanitation Program (UNDP/WB). The recently completed project included technological development (deep-well handpump design and manufacturing, latrine constructions) and demonstration in the autonomous regions of Xinjiang and Inner Mongolia (Neimong). It was observed at completion that: (a) there is a need for development of other appropriate low-cost technologies; (b) although the handpump caretakers employed by the township governments were properly maintaining the facilities, in the long-run, as the number of facilities becomes more numerous, enhancing the capacity of communities to perform operations and maintenance tasks would be preferred; (c) the water supply and sanitation components were indeed complementary; and (d) dissemination of experience to other provinces is needed.

II. THE PROJECT

A. Origin

2.1 During the mid-term review of RWS carried out jointly by the Government and the Bank in 1987, one of the recommendations of the Review Panel was for the Bank to continue its support to the sector through a second project so that the efforts started by the first project could be sustained. It was also suggested that the second project should focus on less developed areas. In August 1989, the Government identified the Guangxi Zhuang Autonomous Region (Guangxi), Yunnan Province (Yunnan), Hunan Province (Hunan), Gansu Province (Gansu), Nei Mongol (Inner Mongolia) Autonomous Region (Neimong) and Xinjiang Uygur Autonomous Region (Xinjiang) as candidates, and formally approached the Bank for assistance. As a result, a pre-identification mission visited China in December 1989, followed by identification in April 1990.

B. Objectives

2.2 The overall objective is to improve health and productivity of the poorest and most needy inhabitants of rural China by increasing coverage of water supply, supported by sanitation services, health/hygiene education, technical assistance and training. Through project preparation and implementation, immediate objectives set for the project are to:

(a) develop long-term sectoral and sub-sectoral strategies to prioritize investments at the county level;

(b) explore and develop appropriate low-cost alternatives as well as formulate affordable and sustainable programs for water supply,

water treatment and sanitation through community participation to maximize project impact;

(c) establish and maintain properly staffed institutions as well as provide technical assistance and training to support adoption, implementation and operation of investment programs;

(d) increase coverage in water supply, sanitation and health/hygiene education through physical construction, provision of equipment and utility vehicles, technical assistance and training; and

(e) establish on-going and expanding programs and enhance community participation and replicability through provision of appropriate models, development and distribution of standards and manuals, as well as dissemination of experience and lessons learned.

C. Description

2.3 The proposed project would serve about 9.1 million rural inhabitants in the six under-developed inland provinces of Guangxi, Yunnan, Hunan, Gansu, Neimong and Xinjiang. A scoring system was devised and used to rank all 560 counties in the six project provinces. Seventy-five project counties were selected on the basis of income level, severity of water-related health problems, extent of water shortage and proportion of minorities in county population. A minimum of one county per prefecture was selected to maximize coverage of physical characteristics and establish capacity for replication. Adjustments were made to take into consideration the communities' willingness and commitment to participate, population density, extraordinary water-related health issues and balance among minority nationalities. Details of the selection criteria and process are included in the Project File. A description of the physical features of the project provinces is in Annex 1. A list of project prefectures and counties is given in Annex 2. The locations of project provinces, prefectures and counties are shown in maps IBRD-23348 and IBRD-23276. The project would comprise five components:

(a) Water Supply (base cost US$120.9 million) - construction of facilities such as waterworks systems, communal faucet systems, wells with handpumps, developed springs, rainwater collectors and related facilities to provide safe and sufficient drinking water to some nine million rural inhabitants; provision of water quality testing equipment and utility vehicles; continuation of development, introduction and dissemination of new technologies through demonstration, publication and distribution of manuals and guidelines;

(b) Sanitation (base cost US$5.9 million) - construction of facilities such as household, communal and school latrines, animal enclosures and drainage ditches in selected demonstration and pilot villages in each project county; provision of the foundation for replicable programs by developing and

demonstrating all aspects of a program which delivers not just latrines, but facilities which are demanded, effectively used and sustained for the duration of their service life;

(c) Health/Hygiene Education (base cost US$6.1 million) - provision of health/hygiene education to all project counties through training of provincial, county and community administrators, trainers, health care workers, teachers, community women and through them the general population; construction of training facilities; development and dissemination of training and health/hygiene education materials; provision of materials, supplies, equipment and utility vehicles;

(d) Technical Assistance and Training (base cost US$6.6 million) - in conjunction with the on-going UNDP project (para 2.12), provision of technical assistance and training in management, finance, procurement, training of trainers, and technical aspects of the first three project components at national, provincial, prefecture, county and community levels; and

(e) Institution Establishment and Project Management (base cost US$6.1 million) - construction of project offices and dormitories; provision of office equipment; and financing of project management and supervision activities.

2.4 Description of the five project components are detailed in Annex 3 to Annex 7. The outline of a terms of reference for a related study on practices of human waste collection and use in agriculture is given in Annex 8.

D. Cost Estimates

2.5 Total cost of the project is estimated to be about RMB Y1,094.6 million or US$189.1 million, net of duties and taxes. The total base cost is estimated at RMB Y773.4 million or US$145.7 million. Estimated cost by component and by province are summarized in Tables 2.1 and 2.2. More detailed project costs are presented in Annex 9. A small national level component of about US$1.2 million has been included in project costs to cover expenses to be incurred by the National Project Office (NPO) for general technical assistance, NPO managed training, office facilities and project management. Expenditures would be shared among the six project provinces as the NPO does not have other means to cover these expenses. Foreign exchange cost of the project is estimated at US$84.9 million or about 45 percent of total base cost.

Table 2.1: Summary Project Cost by Component

	Local	Foreign	Total	Local	Foreign	Total	Base	Foreign
	--(RMB Y Million)--			---(US$ Million)---			(%)	(%)
Water Supply	319.4	322.7	642.0	60.1	60.8	120.9	83	50
Sanitation	31.3	--	31.3	5.9	--	5.9	4	0
Health Education	22.8	9.7	32.5	4.3	1.8	6.1	4	30
TA and Training[5]	26.9	8.4	35.2	5.1	1.6	6.6	5	24
Inst. Est. & Mgmt	25.8	6.6	32.4	4.9	1.2	6.1	4	20
Total Base Cost	426.1	347.3	773.4	80.2	65.4	145.7	100	45
Phy. Contingencies	42.6	34.7	77.3	8.0	6.5	14.6	10	45
Price Cont.[6]	134.4	109.4	243.9	15.9	13.0	28.9	20	45
Total Proj. Cost[7]	603.1	491.5	1094.6	104.2	84.9	189.1	130	45

Table 2.2: Summary Project Cost by Province

	Local	Foreign	Total	Local	Foreign	Total	Base	Foreign
	--(RMB Y Million)--			---(US$ Million)---			(%)	(%)
National	3.5	1.5	5.0	0.7	0.3	0.9	1	30
Guangxi	98.1	61.1	159.1	18.5	11.5	30.0	20	38
Yunnan	78.1	55.6	133.7	14.7	10.5	25.2	17	42
Hunan	89.8	86.9	176.8	16.9	16.4	33.3	23	49
Gansu	54.6	53.1	107.6	10.3	10.0	20.3	14	49
Neimong	55.9	37.5	93.4	10.5	7.1	17.6	12	40
Xinjiang	46.1	51.7	97.9	8.7	9.7	18.4	13	53
Total Base Cost	426.1	347.3	773.4	80.2	65.4	145.7	100	45
Phy. Contingencies	42.6	34.7	77.3	8.0	6.5	14.6	10	45
Price Contingencies	134.4	109.4	243.9	15.9	13.0	28.9	20	45
Total Project Cost	603.1	491.5	1094.6	104.2	84.9	189.1	130	45

Note: Figures may not total exactly due to rounding.

[5] Includes health education for PPO and CPO staff only. All other health education training activities are included in the health/hygiene education component.

[6] Price contingencies amount to 19.8 percent of base cost and 18.0 percent of total base cost plus physical contingencies.

[7] Project-financed goods are exempted from import duties and taxes.

2.6 Base costs are expressed in end-1990 prices. Civil works, labor, local materials and services are estimated at prevailing local prices; ICB goods, equipment and services are based on recent international procurement experience. Physical contingencies of 10 percent have been added to all project components. Price contingencies have been included as follows: domestic escalation rates of 10 percent for 1991, 8 percent for 1992, and 5 percent per annum thereafter; international escalation rates of 9 percent for 1991, 1.1 percent for 1992 and 2.95 percent per annum thereafter.

E. Financing Plan

2.7 The credit of US$110.0 million at standard IDA terms would finance about 58 percent of total project requirements. The remaining 42 percent would be funded by various levels of governments, communities and individuals. Financing plans of individual provinces vary in accordance with their needs to borrow IDA funds and the local governments' and users' ability to contribute. Summary project financing plan is presented in Table 2.3. Financing plans by province and by component are given in Annex 10. The credit is expected to cover all foreign exchange requirements and an average of 24 percent of local costs.

Table 2.3: Financing Plan

	Local	Foreign	Total	Percent
	-----	(US$ Million)	-----	
Provinces and Prefectures	23.0	-	23.0	12
Counties and Townships	18.9	-	18.9	10
Communities and Individuals	37.2	-	37.2	20
IDA	25.1	84.9	110.0	58
Total	104.2	84.9	189.1	100

F. Onlending Arrangements

2.8 Proceeds of the credit would be passed on to the sub-project entities (a sub-project entity may be a village, a group of villages, a township, a water company, or a county, depending on the size and ownership structure of the proposed works) in two steps, first from the Central Government (Ministry of Finance) to the provinces, then from the provinces through the counties to the sub-project entities. Based on provincial preferences and their foreign exchange earning capabilities, MOF will determine whether to onlend to the provinces in foreign exchange or local currency to cover local cost expenditures.

2.9 During negotiations, onlending terms and conditions from the Government to the project provinces were confirmed as follows:

(a) foreign exchange portion (denominated in SDR) - fixed interest of two percent per annum for a 20-year maturity including five years grace, foreign exchange risk would be borne by the provinces and not to be passed on to lower level governments or sub-project entities; and

(b) local currency portion (denominated in RMB) - fixed interest of four percent per annum for a 20-year maturity including five years grace.

Further on-lending from the province down would be at fixed interest of four percent per annum for a maximum maturity of 20 years including up to five years of grace. Foreign exchange risks would be borne by the provinces.

G. Rationale for IDA Involvement

2.10 The project would support the Bank Group's objective of increasing its focus on poverty and the environment in lending to China. The continuation of IDA's participation in the rural water supply sub-sector is essential to sustain the momentum generated under RWS. The integrated approach of RWSS would provide an opportunity to develop and demonstrate appropriate models for national replication. Experience and lessons learned from earlier projects (paras. 1.30-1.42) are being shared in workshops. Various manuals developed and published under RWS are being disseminated to new project areas to facilitate sub-project planning and design. During project preparation, existing water supply manuals were reviewed and gaps were identified. A supplemental manual on non-piped technologies is being prepared. Water quality guidelines appropriate for the rural setting were developed. A first sanitation planning and design manual is also under preparation.

2.11 In addition, IDA's involvement would foster communication and collaboration among governmental agencies at national as well as local levels. It would help the borrower gain access to knowledge of and experience with appropriate alternative low-cost technologies developed and proven successful in other parts of the world. RWSS is designed to build on and complement work already planned locally and by international agencies such as the UNDP/WB (paras. 1.42 and 2.12.) and the European Economic Community (EEC) (para. 2.13). Due to IDA's involvement, the project is also expected to draw support from other international and bilateral agencies such as the WHO, the United Nations Children's Emergency Fund (UNICEF), the World Food Program (WFP) and the Danish International Development Agency (DANIDA).

H. International Donor Agency Support

2.12 United Nations Development Programme. In cooperation with the Bank and the Gesellschaft für Technische Zusammenarbeit (GTZ), UNDP has provided technical assistance to the water and sanitation sector since 1983. Low-cost and appropriate technologies for poor and remote

communities were introduced. After initial field testing, demonstration handpumps (such as deep-well and direct-action types) and latrines (such as the ventilated improved pit (VIP) type) were installed between 1986 to 1987 in the provinces of Hebei, Hunan and Beijing Municipality. To demonstrate proper planning, implementation and maintenance of low-cost community water supply and sanitation programs, the "Low-Cost Rural Water Supply and Sanitation Project" was initiated in 1988 and satisfactorily completed in 1990 in Xinjiang and Neimong (para. 1.42). As a direct support to RWSS, the "Capacity Building and Investment Preparation for Rural Water Supply and Sanitation in Poor and Remote Areas Project" covering the same six provinces as RWSS was approved in August 1991. Total project cost is estimated at US$3.7 million, UNDP would provide about US$1.2 million to cover all foreign costs. The project would include about 18 staff-months and 78 staff-months of technical assistance input by international and national consultants respectively. A more detailed description of the project is provided in Annex 11.

2.13 European Economic Community. In collaboration with NPHCCO, an EEC funded consultant completed and published three sector study reports (one at national level and two for the provinces of Gansu and Guizhou) for the rural water supply sub-sector in 1990. The primary objectives of the studies were to identify ways to: (a) improve water supply services to rural areas; (b) increase the effectiveness of investment; and (c) strengthen the institutional capabilities of sector agencies. A sum of 1.1 million European Currency Units (US$1.2 million equivalent) was provided to finance foreign costs. In addition, EEC also sponsored training of local personnel of the newly completed China Rural Water Supply Technical Center (para. 3.5) and provided office equipment to NPHCCO.

III. PROJECT IMPLEMENTATION

A. Organization for Implementation

3.1 Project implementation is divided into national, provincial and county levels. Leading groups have been formed to provide policy guidance and inter-sectoral coordination. Project offices have been established to carry out day-to-day project implementation functions. These offices would be supported by other organizations involved in the sector as well as by international and national consultants.

3.2 National Level. A leading group comprising the Minister of MOPH (concurrently Director of NPHCCO), and two directors from MOPH and NPHCCO would provide overall policy guidance. A National Project Office (NPO) under the auspices of NPHCCO has been established to handle all project related activities at the center. The office is staffed with personnel from MOPH and NPHCCO and is expected to function relatively independently for its day-to-day work including coordination with IDA and other central agencies in addition to overall project management, monitoring, control and evaluation. NPO is also responsible for preparation of consolidated

project accounts, approval of technical designs for large sub-projects, ICB procurement, and organizing technical assistance and training activities for national and provincial level staff.

3.3 Provincial and County Levels. At the provincial level, leading groups or the existing Provincial Patriotic Health Campaign Committees comprising senior officials from related sectors and headed by vice-governors would be responsible for providing policy guidance. Provincial project offices (PPOs) have been set up along the lines of the NPO to perform corresponding functions at the provincial level. Similar organizations were also set-up at the county level.

3.4 The organization charts of the NPO, PPOs and CPOs, the detailed delineation of functions and responsibilities and flow of communication among the various level offices, policy making bodies, supporting agencies and communities are presented in Annex 12. Staffing of the project offices is given in Annex 13. At present, only about 70 percent of planned positions are filled. It is expected that the offices would be fully staffed by the end of the first year of implementation. During negotiations, assurances were obtained that the NPO, PPOs and CPOs would be maintained with qualified staff in adequate numbers.

3.5 Supporting Institutions. The China Rural Water Supply Technical Center (CRWSTC) under NPHCCO which started its operation in November 1991 in Changping (suburban Beijing) is expected to provide training facilities, assist NPO to recruit trainers, and prepare materials for certain training courses. Health/hygiene education campaigns, training programs and textbook preparation would be coordinated, supported and evaluated at the national level by the National Health Education Institute which can bring some valuable experience to this task and the Center. The CRWSTC is also expected to carry out research and produce materials for health and hygiene education. The Center is headed by a director and has a technical staff of about 25. It is comprised of five divisions of which three are technical: water supply, sanitation, training and health education. Services of the CRWSTC are expected to be provided to project offices at cost.

3.6 At the local level, the existing design and research institutes, health education institutes, local level health organizations, and construction offices of local governments are expected to provide support to the project. Specifically, the health/hygiene education component would be primarily the responsibility of the provincial health education institutes who would oversee its implementation by the district health education institutes, by the Epidemic Prevention Stations at the county level and, where available, by health centers at the township level.

B. Status of Project Preparation

3.7 Project Appraisal Approach. In order to allow more flexible planning in outer years as project entities gain experience with new technologies and approaches introduced in the initial years, it was decided that the project would be appraised in a programmatic fashion with rolling

plans for each project component to be prepared, reviewed and approved annually (para. 3.18).

3.8 Status of Preparation. During project preparation, the project team examined long-term strategies, their underlying principles and investment programs of each component based on detailed first year programs and outline programs for the remaining years. Draft national, provincial (six) and county (18, three representative proposals per province) project proposals and typical design reports for water supply and sanitation constructions were reviewed in detail. The proposals and design reports including the 47 county proposals not reviewed by IDA were prepared by the various project offices with support from a consultant team financed under the Second UNDP Umbrella Project. Although marked improvements have been made to the original proposals over the project preparation period, some adjustments are still being incorporated into the revised documents to reflect decisions made during appraisal and negotiations. Understanding has been reached on the following timetable for their submission to the Association by the NPO: (a) January 31, 1992 - National Project Proposal and letter affirming that agreements reached during appraisal and negotiations have been properly and adequately reflected in the revised individual provincial and county proposals; and (b) by Effectiveness - all six provincial proposals and 18 representative county proposals.

3.9 In order to establish appropriate guidelines and acceptable standards for the design of non-piped water supply and sanitation facilities, manuals drafted by NPHCCO are currently being reviewed by international experts. Finalized design manuals are expected to be published by April 15, 1992. During negotiations, agreement was reached that the use of project funds for civil works would be subject to the satisfactory dissemination of these design manuals. Distribution of the two manuals to all project counties are expected to be completed by May 31, 1992.

C. Implementation Strategy and Program

3.10 The bulk of project funds would be used for physical construction of water supply facilities as the demand for such services is obviously high. Sanitation and health/hygiene education have been included in the project in recognition of their complementarity to water supply improvements in achieving the project objectives of improved health of rural communities. Technical assistance, training and institution establishment components would provide the necessary support for implementation and future replication. RWSS has been designed to exploit and demonstrate the benefits of an integrated approach of these components.

3.11 Water Supply. The first year investment program would comprise, in the main, construction of facilities using conventional technologies well accepted by the communities. Household connections would be kept at a minimum in order to benefit more villages. Appropriate new technologies (low-cost, non-piped systems) included in the supplemental design manual (paras. 1.22 and 3.9) would also be tested and demonstrated. Outer year

investment programs are expected to include a higher percentage of new technologies as experience accumulates and the demonstrated non-conventional technologies gain acceptance. In order to ensure proper programming of outer year activities, a process (hurdle test) for the selection of appropriate and cost-effective water supply technologies based on physical characteristics and financial considerations was developed. The agreed process would be adopted for use by the project counties.

3.12 Sanitation. The component was designed recognizing not only the very limited budget available, but also the need to develop and demonstrate successful implementation strategies, to promote demand for improved sanitation, and to make more hygienic the historical practice of utilizing human wastes in agriculture. During the initial years, project and related activities would include: (a) preparation of draft provincial rural sanitation strategies in each province to provide the basis for on-going programs; (b) a focus on pilot villages and demonstration sites (in non-pilot villages) in each project county which can serve as examples for subsequent replication in the immediate vicinity; (c) construction only of latrine designs contained in the sanitation manual, or approved as meeting guidelines set down in the manual, so that their performance can be evaluated; (d) testing and refining of financing and cost recovery proposals; (e) training of latrine builders to meet the expanded demand of on-going and expanding programs; and (f) in conjunction with RWSS execution of an externally assisted study of human waste use in agriculture (para. 2.4).

3.13 Health Education. In order to devise effective health education programs, each province has formulated a strategy which: sets out the proposed objectives and targets; determines the intended target groups (e.g., families below a certain income level, peasants and herdsmen, minority nationalities, children, mothers, women); determines the degree of participatory versus instructional approach in conveying hygiene and health education messages; selects the principal health education instruments to be applied; proposes the required institutional responsibilities; and decides on knowledge, attitude and practices (KAP) studies as well as on the system of monitoring and evaluation.

3.14 On the basis of this strategy, each province has prepared a broadly defined five-year hygiene and health education program in support of the project. These programs include activities such as: training of trainers and familiarization campaigns for community leaders; writing of training manuals; preparation and instruction of hygiene and health education classes; revision of hygiene and health education textbooks; initiation and implementation of hygiene and health education campaigns for the project; development of health personnel curricula and their implementation; establishment and training of theater groups; and devising and implementation of specific media programs. For the first project year of this five-year program, the hygiene and health education activities have been defined in much more detail and then prioritized, thus serving as a work program.

3.15 A two-pronged approach would be used in the project. While guidance to invoke significant changes in hygiene habits must originate from the top by the respective authorities who would also need to provide the necessary conditions in terms of trained personnel and other resources, most of the household level training should be carried out by the villagers themselves through selected village women. Thus, these community women would be the key trainers for their families and other families alike.

3.16 The project would work not only with the conventional palette of hygiene and health education instruments in familiarizing the project beneficiaries with the desirable changes in water and sanitation practices and in changing age-old attitudes and hygiene behavior. Since most of the project beneficiaries are poor, not well educated and may belong to remotely located minority groups who are often apprehensive about any outside influences, an intensive and interactive training approach devised by health educators and social scientists with extensive experience with rural and minority populations would be used. The resulting training programs would have a strong participatory content in order to raise awareness, to ensure that the whole community supports the proposed activities, and to pay due regard to the needs of the particular circumstances of each village.

3.17 Technical Assistance and Training. The introduction of new technologies and approaches makes implementation of well planned technical assistance and training programs crucial to the success of the project. The technical assistance component would include both international and national experts to provide advice and review for the water supply, sanitation and the health and hygiene education programs. Foreign experts would mainly be working with the national and provincial level offices and would concentrate on the training of trainers and national experts. The CRWSTC would be used for some national training courses (para. 3.5). Local experts would be expected to assume the advisory role for the provincial, county and township/village level offices and training of their staff and workers. The NPO, PPOs and CPOs have each prepared a training schedule and the overall program would be coordinated by the NPO and updated yearly at a training conference.

D. Implementation Plan and Schedule

3.18 The proposed project is expected to be implemented over a period of about five years (mid-1992 to mid-1997). Implementation schedules for RWSS and related activities are shown in Annex 14. In line with the programmatic approach, during negotiations, assurances were obtained that starting 1992: (a) the PPOs would prepare provincial project implementation programs[8] for the following year and submit them to the NPO for review and

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[8] These plans would contain, inter alia, information on the number of villages in project counties with fluoride levels higher than 2.0 mg/liter as well as the number of villages with improvements planned to provide water supply with acceptable fluoride levels of 2.0 mg/liter or less.

approval no later than September 1; and (b) the NPO would prepare a comprehensive project implementation program including plans for the national component and the six provinces for the following year and submit the plan to IDA for review and approval no later than October 15. It was understood that in order to align project planning with fiscal planning, an interim implementation plan covering the period from project effectiveness to December 31, 1992 would be prepared. The consolidated plan would be submitted to IDA by the NPO by April 15, 1992.

E. Sub-Project Preparation

3.19 Water Supply. During appraisal, representative design reports of piped systems and typical non-piped schemes were reviewed and found satisfactory, with the exception of shallow-well handpumps which would require improvements. For piped systems, planning and design manuals developed under RWS would be used. For non-piped technologies, the supplemental design manual which is expected to be available by May 31, 1992 (para. 3.9) would be used. The CPOs would have authority to review and approve designs for construction of less than RMB Y0.5 million and the PPOs for construction between RMB Y0.5 million and Y2.0 million. For construction over RMB Y2.0 million, NPO's review and approval would be required. All proposed piped systems would undergo a three-step process: (a) submission of proposal in the format as agreed during negotiations; (b) preliminary design; and (c) detailed engineering design[9]. During negotiations, assurances were obtained that planning and design of sub-projects would be done in accordance with the criteria contained in the planning and design manuals and the agreed criteria and procedures for review and approval of sub-projects would be followed.

3.20 Sanitation. In line with the programmatic approach to appraisal of the project only the first year projects have been appraised in detail. However, the sanitation component is relatively small and the range of designs of sanitation facilities is limited. All sub-projects must be based on designs which are included in the Sanitation Manual due to be distributed by March 31, 1992 (para. 3.9) or which conform to guidelines and criteria laid down in that manual and are specifically approved. Latrine designs will be reviewed after the first year of the project to assess the quality and ease of construction, use and maintenance of the facility, and its performance in treating the wastes. Future sub-projects will not include any latrine types which are assessed as unsatisfactory and criteria will be established for the review and approval of each sub-project proposal.

3.21 The sanitation component includes intensive improvement of sanitation facilities in 150 model villages where a high degree of service coverage is desired. These sub-projects will cover one or more villages in each project county and will be constructed during the initial two to three

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[9] For small piped systems expected to cost less than RMB Y0.5 million, steps (a) and (b) may be combined.

years of the project. After a model village project is completed, further sanitation sub-projects can be implemented by expanding the sanitation program to other pilot villages located within the same vicinity as the model village which will serve as an example to be followed. Criteria for selection of pilot villages will include: a reasonably even geographic distribution; concentration on the larger villages or groups of villages; and the enthusiasm of villagers as indicated by their commitment to make contributions in cash or kind and to repay any financial assistance from government. Sub-projects in pilot villages will provide only a small number of latrines which will be built for training and demonstration purposes. Depending on the availability of funds through cost recovery, and on the amount of private contributions towards latrine construction, the sub-projects will expand to increase the sanitation coverage of each village.

3.22 Health Education. With the first-year hygiene and health education program clearly defined, the hygiene and health education component can be implemented quickly in parallel with the start-up of the water supply systems and the initial pilot sanitation facilities. During this initial period, most of the training of trainers at the provincial, county and village level will have to take place. During the following years, detailed annual plans will be prepared for each of the following years until project completion.

3.23 Special emphasis would be put on the early construction and operation of training facilities and other physical infrastructure needed to support the hygiene and health education component, such as design studios and office accommodations for health educators who are presently often without adequate work space. The acquisition of television, video and hygiene and health education materials would only take place after the approval of the detailed annual hygiene and health education program.

F. Procurement

3.24 The items to be procured under the project are civil works, materials and equipment, utility vehicles, technical assistance and training. The NPO would be responsible for the overall coordination of procurement activities, training in procurement at provincial level and the ICB procurement process. The PPOs would be responsible for the LCB procurement process and local training. Deliveries of materials would be staggered to accommodate the implementation schedules of the provinces and counties. The respective offices would be responsible for the storage and accounting of the project materials and equipment. All procurement would follow the Association's Procurement Guidelines.

3.25 Civil Works. Civil works would include construction of water supply and sanitation facilities and buildings (offices, dormitories, training facilities, and material depots/warehouses). Because of the small sizes and dispersed locations, all civil works would be contracted by LCB, local shopping or force account. Contracts above US$400,000 would be contracted by the PPOs following LCB procedures acceptable to the

Association. Local shopping procedures with at least three bids from pre-qualified contractors could be used for contracts below US$400,000 up to an aggregate amount of US$63.0 million. Included in this amount, force account may be used for facilities below US$20,000 in areas where there is no adequately qualified or interested contractor up to an aggregate amount of US$13.5 million. The contractors would be asked to provide all local materials, including cement as it would simplify contracting and facilitate the construction process. Contracts expected to cost between US$100,000 and US$400,000 would be contracted by the PPOs and contracts less than US$100,000 would be contracted by the CPOs. Construction supervision would be carried out by the CPOs, PPOs and the NPO as appropriate.

3.26 Goods, Equipment and Materials. Procurement of major items of goods: pipes, steel and pumps along with audio-visual training equipment and utility vehicles amounting to about US$77.3 million would be packaged and carried out by the NPO following ICB procedures. The China National Machinery Import/Export Corporation International Tendering Division would act as the procurement agency. Qualified domestic suppliers would receive a preference in bid evaluation on ICB bidding of 15 percent or the prevailing rate of customs duties and import taxes, whichever is lower. All packages above US$0.2 million for equipment or materials are expected to be procured through ICB procedures.

3.27 Technical Assistance and Training. Both national and international consultants would be used in the technical assistance and training activities and would be selected following the "Guidelines on the Use of Consultants by the World Bank and its Borrowers". A total of about 47 person-months of foreign and 240 person-months of local technical assistance is provided in the project.

3.28 IDA Review. The Association would review, prior to bidding, items of goods and equipment to be procured under ICB along with changes made in the standardized bidding documents. Standardized bidding documents prepared for China under the auspices of IDA and MOF for ICB of goods and equipment and LCB of civil works would be used. Prior review of civil works contracts over US$2.0 million and goods/equipment contracts over US$0.5 million would result in about five contracts subject to IDA's prior review, covering about 80 percent of total expenditures. In addition, IDA would review consultant contracting procedures and contract awards above US$10,000. Sample post reviews of civil works procured by LCB and other methods would be carried out during regular supervision missions.

3.29 The planned procurement arrangements are summarized in the following Table 3.1.

Table 3.1: Procurement Arrangements
(US$ million)

	Procurement Method				
	ICB	LCB	Other[10]	NIF	Total
Civil Works					
a. Water Supply Systems		26.7 (9.3)	62.6 (21.8)		89.3 (31.1)
b. Sanitation Facilities				4.8 (0.0)	4.8 (0.0)
c. Buildings				1.1 (0.0)	1.1 (0.0)
Goods and Equipment					
a. Materials	56.7 (56.7)				56.7 (56.7)
b. Pumps and Equipment	13.1 (13.1)				13.1 (13.1)
c. Audio-visual Equipment	0.7 (0.7)				0.7 (0.7)
d. Utility Vehicles	6.8 (6.8)				6.8 (6.8)
Technical Assistance and Training					
a. Tech. Assistance & Training			8.7 (1.6)		8.7 (1.6)
b. Design Review & Supervision				7.9 (0.0)	7.9 (0.0)
TOTAL (IDA Financed)	77.3 (77.3)	26.7 (9.3)	71.3 (23.4)	13.8 (0.0)	189.1 (110.0)

Note: Figures in parentheses are the respective amounts financed by IDA.

NIF = Not IDA Financed

[10] Other methods include local shopping procedures approved by the Association for civil works and consultant services as well as force account for limited civil works.

G. Management and Community Participation

3.30 Water Supply. For piped water systems, water companies will be set up under the supervision of the township government. A typical company is composed of three divisions: management (accounting, billing and collection); operation and maintenance (technical) and water quality monitoring. Management of non-pipe systems and community rain-water cisterns rests with the township government's unit which is responsible for assigning well caretakers. The concerned households would be responsible for household rainwater collectors.

3.31 In all project development stages, community involvement and participation including women would be encouraged by the government. In the long-run, village level organizations would be established to be responsible for the operation and management of non-piped water systems and public latrines (para. 1.42).

3.32 Health/Hygiene Education. Primary implementation responsibility for the component lies with the Patriotic Health Campaign Committee Offices and/or Public Health Bureaus of each province. Project activities will be administered by the PPOs. The health education institutes will prepare long-term and annual programs based on the proposals submitted by each of the 75 project counties. During implementation of these programs, the leaders at the district, township and village levels, health and social workers as well as teachers, community women and other village hygiene and health education facilitators will play important roles in conveying messages relating to proper water, sanitation and hygiene practices as well as adherence to good health and hygiene standards.

3.33 At the community level, household visits and group discussions, rather than didactic and theoretical training, would be organized by the community leaders themselves and supervised and monitored by the respective health education institute. At the national level, the NPO would administer hygiene and health education activities of all six project provinces with expert guidance from CRWSTC and the National Health Education Institute.

H. Operations and Maintenance

3.34 Water Supply Facilities. For piped water supply systems, water companies will be established and adequately staffed by the townships with responsibilities in management (billing, collection and accounting), operation and maintenance (technical) and water quality control. Operation and maintenance of the non-piped community systems such as deep-well handpumps and cisterns would be undertaken by caretakers assigned by the township government. However, it is expected that community associations would be established to carry out the functions in due course as the number of systems becomes numerous. Households will be responsible for wells and rainwater collectors serving single families.

3.35 Sanitation Facilities. Sanitation facilities to be constructed under the project include both public/communal facilities and those which are privately owned. School latrines will be the responsibility of each school to maintain whereas public latrines come under the control of the Town Station for Sanitation of the Urban Construction Bureaus. Collection and removal of nightsoil is to be contracted to a local farmer who will be responsible for cleaning and maintaining the facilities. Private facilities will be operated and maintained by each household.

I. Disbursement

3.36 There is not a standard disbursement profile for rural water supply projects in China. The credit would be disbursed over a period of about six years as the project is expected to cover an investment program of about five years. Estimated credit disbursement schedule is given in Annex 15. The project is expected to be completed by June 30, 1997 and the closing date would be December 31, 1997. The proposed disbursement arrangements are summarized in Table 3.2. The credit would finance about 32 percent of total civil works for water supply facilities.

Table 3.2: Disbursement Arrangements

Category	Amount	Expenditures to be Financed (%)
Civil Works for Water Supply Facilities	28.0	Guangxi - 40% Yunnan - 40% Hunan - 35% Gansu - 60% Neimong - 10% Xinjiang - 45%
Goods, Equipment, Materials and Utility Vehicles	69.6	100% of foreign expenditures and 100% of local expenditures (ex-factory).
Consultant Services and Training	1.6	100% of foreign expenditures
Unallocated	10.8	
Total	110.0	

3.37 Special Account. In order to facilitate disbursement, a Special Account would be maintained by MOF with an authorized allocation of US$7.0 million to cover about four months of expected requirements for IDA financed items. Application for replenishment would be submitted monthly to IDA or whenever the account is drawn down by about 50 percent of its initial deposit, whichever occurs first.

3.38 Documentation of Expenditures. Disbursement would normally be made against full documentation except in the cases of civil works carried out by force account, contracts for works and goods valued at less than US$200,000 and consulting services valued at less than US$10,000 when reimbursements would be made on the basis of Statements of Expenditures (SOEs). MOF would be responsible for maintaining and certifying the SOEs, aggregating the eligible expenditures and preparing withdrawal applications for submission to IDA. Documentation supporting SOEs would be retained by MOF and made available to IDA for review during supervision missions. Civil works carried out by force accounts should be supported by progress reports showing unit costs agreed by IDA and reflected in the annual project implementation programs.

3.39 Provincial Revolving Accounts. In order to facilitate disbursement for local cost expenditures, six provincial Revolving Accounts, one for each of the six project provinces would be established. During negotiations, it was agreed that each Revolving Account would be opened no later than April 30, 1992 and maintained in RMB with an allocation to cover about three months of expected local cost expenditures. Procedures for withdrawal and replenishment have already been drafted and will be provided to the Association. It is expected that replenishments would be made monthly. Provincial allocations are estimated to be as follows: Gansu US$310,000; Guangxi US$370,000; Hunan US$350,000; Neimong US$60,000; Xinjiang US$210,000 and Yunnan US$280,000.

J. Monitoring, Supervision and Evaluation

3.40 A methodology for monitoring project status, reporting, reviewing and taking corrective actions has been devised. The flow of information would emanate from the CPOs which would compile all sub-project status reports and activities carried out by them. These progress reports would be forwarded to the PPOs on a quarterly basis. The PPOs would consolidate county reports and activities carried out by the PPOs to form quarterly provincial reports and forward them to the NPO. The NPO would in turn consolidate provincial reports and activities carried out by the NPO to form quarterly national progress reports. During negotiations, understanding was reached that the NPO, throughout project implementation, would submit consolidated semi-annual progress reports for all project activities to the Association, starting January 31, 1993 for the six-month period ended December 31, 1992.

3.41 Major monitoring indicators include: project cost estimates, implementation schedule, staffing, status of ICB and LCB procurement, physical progress, affordability analysis, progress of health education, technical assistance and training programs, major implementation issues as well as proposed solutions and required actions. Proposed monitoring indicators are given in Annex 16. Detailed contents and format of semi-annual progress report were discussed and confirmed during negotiations. A supervision plan for the first year of project implementation is presented in Annex 17. Supervision plans for subsequent years would be developed in parallel with project implementation plans.

3.42 Design review and construction supervision would be undertaken by staff of the CPOs, PPOs or the NPO depending on the scale of the sub-project. These offices would be supported by consultants and engineering institutes if necessary. Supervision will involve assessment of quantity, quality, progress of constructions; control and distribution of materials and equipment on site; resolution of site problems and certification of completion and payments. Project evaluation would measure achievement of project objectives and annual plans as well as deviation from norms. Lessons learnt would also be used in the formulation of future plans.

3.43 A project completion report would be submitted by the NPO to IDA within six months of the closing date of December 31, 1997.

IV. FINANCE

A. Past Performance

4.1 The central government is generally not involved in the financing of physical facilities in the rural water supply and sanitation sector. Capital costs for rural water supply are mostly (about 90 percent) met by communities, rural enterprises and household users, supplemented by budgetary allocations from local government at various levels (para. 1.17). Capital costs for public sanitation facilities are often funded by local governments while household facilities are privately built with virtually no subsidy. Expenditures for health and hygiene education are covered by local budgets. Except for the facilities built under RWS, there has been virtually no use of debt for financing investments.

4.2 At the consumer level, users of public water supply systems almost always pay the recurrent costs. Metered household connections where users pay in accordance with actual consumption are still uncommon. Most villagers pay a per capita charge based on average consumption and rate set by the authorities. Meters are more commonly installed for commercial and rural enterprises and generally these consumers are subject to higher rates. Charges are usually collected on a monthly basis, either in cash or from collective funds of the villages. Water charges normally cover the cost of operations and maintenance, and often times some depreciation. Maintenance costs of public latrines are generally borne by the local government, facilities are provided to users free of charge.

B. Counterpart Financing Arrangements

4.3 Water Supply. An average of about 34 percent of civil works and materials for construction of water supply systems under RWSS would be financed locally. Provincial and prefecture governments' agreed contribution to the project would be appropriated annually and made available to the CPOs through the county finance offices in tranches in accordance with annual budgets which are generally approved during the first quarter of each year. At the county and township levels, funds would

be allocated more frequently depending on needs and physical progress of construction. At the village level, community and beneficiaries' cash contribution would be collected three to six months in advance to ensure firm commitment from the users and to cover start-up expenditures. Between 30 and 40 percent of contribution by users would be in-kind (labor and local construction materials). Details of various procedures proposed for collection of counterpart funds are described in project proposals included in the Project File.

4.4 Sanitation. All sanitation facilities to be built under the project would be locally financed. Public and school latrines would be funded by the local governments through budgetary allocations. Demonstration household latrines and other sanitation facilities would be heavily subsidized (up to 70 percent) during the initial years to encourage support. Progressive reduction in subsidy would be necessary for the program to be sustainable. It is expected that at the end of the project, 70-80 percent of capital cost for private facilities would be contributed by the users in cash or in kind.

4.5 Other Components. Counterpart funds would be used to cover all local costs of the health education, technical assistance and training, and institution establishment and project management components. These expenditures would be provided through budgetary allocations in accordance with the agreed financing plans.

C. Cost Recovery Plans and Water Charges

4.6 Paying full cost for water supply services is generally expected of and accepted by consumers. For sub-projects built under RWSS, the same principle would be continued. Since all project components other than sanitation which is concentrated in pilot villages and demonstration areas are seen as directly benefitting the entire population served by water supply, it was decided that the credit would be recovered through water charges unless otherwise agreed as in Hunan, Gansu and Xinjiang where the governments had agreed to provide subsidies for debt service (Annex 10).

4.7 For all project counties, water charges required to recover net cost (i.e. full costs less subsidies) of each type of water supply technology have been derived. Tariff level and consumer affordability are discussed in section E. During negotiations, assurances were obtained that water charges for all sub-projects would be set to cover operations and maintenance costs plus the pro-rated portion of the amount to be repaid by the province to MOF not covered by government subsidies; and operations and maintenance costs and depreciation after the debt has been amortized.

D. Provincial and County Finances

4.8 Affordability at the Provincial Level. Historically, expenditure in the rural water supply and sanitation sector has been less than one percent of total spending in all project provinces. Between the years 1987 and 1989, the annual expenditure of RMB Y41.7 million (0.5

percent of total expenditures) in Hunan ranked highest in absolute terms. Projected annual financing for RWSS would comprise an average of 0.08 percent of total provincial budget with Gansu at the top at 0.19 percent. Average outlay for the year of peak spending is about RMB Y5.0 million per province with Gansu the highest at RMB Y8.8 million. Based on the absolute and relative sizes of the governments' financial commitment to the project, it is expected that the provincial governments would be able to meet their obligations. It is also expected that the provinces would ensure that the counties and communities under their jurisdiction would do likewise.

4.9 Affordability at the County Level. Statistics on historical county spending on the sector are hard to obtain and data collected is rather unreliable. However, it can be stated that sector investment varied greatly. Exceptionally high expenditures are generally linked to special local campaigns and initiatives. During the period 1987 to 1989, sector spending in each of the 75 project counties ranged from less than 0.01 percent to 6.6 percent of total county budgets.

4.10 Over the project implementation period, counties' annual RWSS expenditures are projected to take up between 0.3 to 3.1 percent of total annual county budgets. For many project counties, particularly the very poor ones, these commitments are high compared to historical trends. During the course of project preparation, county governments had repeatedly stated their commitment and willingness to accord high priority to the project. In view of the common practice of allocating funds for special initiatives, and the still relatively small size of the project, the proposed investment plans appear to be financially affordable at the county level. Summarized provincial and county finances are presented in Annex 18. Historical and projected financial data for all project provinces and counties over the period 1987 to 1992 are included in the Project File.

4.11 Sustainability. Although the project is generally affordable, the ability of governments to provide continual and regular financial support to sustain growth in the sector is an issue that needs further attention. So far, due to the lack of planning and funding (paras. 1.19-1.20), development of the sector has been sporadic. Regular investment in the sector by various levels of government has been insignificant and supply-driven. Special initiatives prompted by disasters (such as the cholera epidemic in Xinjiang) and outside interventions (such as IDA and UNDP involvements) happen infrequently. For sustained growth, sector financial planning would need to be strengthened. The project would assist governments at the county level in this aspect through the development of overall strategies and affordable long-term programs.

E. Beneficiary Affordability and Willingness to Pay

4.12 Affordability. The project has been designed to serve the rural poor. Users' affordability was the most important factor in the selection of technology and service level. Typical costs and affordability analysis are summarized in Annex 19. Derivation of these costs are contained in the project proposals in the Project File. On the whole, affordability when

considered in connection with willingness to pay is not expected to be a problem. On an exceptional basis, it was noted that community funds would be used to assist the extreme poor.

4.13 Willingness to Pay. Water supply users are generally willing to pay for services. During the 1980s, 90 percent of all capital expenditures were paid by users comprising rural enterprises, communities and individuals. In addition, water charges to cover at least the full cost of operation is expected and generally accepted (paras. 1.17 and 4.1-4.2). When water is scarce or is of noticeably low quality, villagers' willingness to pay can easily be demonstrated through: (a) their eagerness to contribute to construction in cash and in kind; and (b) their commitment to pay the full cost of operations and service debts. However, little quantifiable data is available to shed light on less obvious cases. It is not clear whether the very poor are willing to pay the full cost of up-to-standard water when alternative sources, usually of inferior quality are readily available free of charge. Two studies of affordability and willingness to pay are being planned: a small scale one with a focus on reliability and women in development aspects along with the preparation of the Project Completion Report for RWS, and one under the UNDP/WB capacity building project (para. 2.12) in selected RWSS project areas. Further studies would be included in RWSS as necessary.

F. Accounts and Audit

4.14 Sub-Project Accounting. A system for flow of funds and accounting for project expenditures during construction has been developed during preparation of RWS and refined during preparation of RWSS. The system provides for: (a) the accounting of local expenditures at the community level and consolidation at county, provincial and national levels; (b) the flow of funds from IDA, provinces, prefectures (where applicable) and communities; and (c) the allocation of goods and expenditures for ICB and LCB items to the respective local level offices and communities. The RWS system to record revenues, expenditures, assets and liabilities of waterworks after they become operational would also be followed.

4.15 Project Accounts. Basic project accounts showing expenditures by project component during implementation would be maintained in the CPOs. A provincial project account consolidating county accounts, provincial component expenditures and the province's share of expenditures incurred or administered by the NPO would be maintained at each of the six PPOs. In addition, each PPO would also maintain its Revolving Account with proper documentation of expenditures. A total project account aggregating all provincial accounts would be maintained by the NPO. The NPO would also be required to keep records and maintain an account for all project funds administered or used by the office. MOF would maintain accounts showing amounts expended under SOEs for each year and would maintain the Special Account.

4.16 Audit. Expenditures of the communities would be consolidated by the CPOs and audited by the county audit offices. The provincial accounts would be subject to audit by the provincial audit bureaus. It was agreed that a comprehensive audit report covering: (a) the consolidated account of project expenditures prepared by the NPO; (b) SOEs and Special Accounts maintained by MOF; and (c) the provincial Revolving Accounts maintained by the PPOs would be prepared annually by the State Audit Administration (SAA). During negotiations, assurances were obtained that the annual comprehensive audit reports prepared by independent auditors acceptable to IDA would be submitted to the Association within six months after the end of each fiscal year. Content and format of audit reports were discussed and agreed during negotiations. It was understood that for purposes of IDA review of provincial level audits, copies should be made available by the National Project Office (NPO) in Beijing for supervision missions.

V. PROJECT JUSTIFICATION AND RISKS

5.1 The project would benefit about nine million persons in 75 rural counties. It is expected to alleviate human suffering associated with poverty and ill health. It is also expected to bring about better quality of life through growth and improved physical as well as institutional environment.

A. Poverty Focus and Impact

5.2 The project has been designed to benefit the poorest and most needy rural population of China to the extent practicable.

5.3 Selection of Location. Poverty is commonly associated with diseases. In China, life is particularly harsh in remote and mountainous regions and for minorities where development has generally lagged behind that of the rest of the country. In order to target investments to maximize project impact on the poor, all the above factors have been taken into consideration in the selection of project counties (para. 2.3).

5.4 Selection of Technologies. In order to encourage and enable poor local governments as well as communities to participate and therefore benefit from the project, only basic water supply and sanitation services would be financed under RWSS. For water supply, low-cost technologies such as deep-well handpumps and cisterns would be adopted where appropriate. Where piped systems are considered more cost effective, use of public stand-post is being encouraged.

5.5 Impact. Through improved access to basic levels of water supply, time and energy saved on water collection would be spent on child and elderly care and productive activities. By bringing about improved sanitation services and hygienic practices, the project is expected to have substantial health benefits in disease reduction. It would reduce morbidity which is costly both in terms of productive time loss and medical

expenses. During construction and operation phases, the project would provide training and income-earning (or cost-saving through contribution in kind) opportunities for women and men. Experience gained would also enhance the ability of participant communities to compete for jobs of similar nature in their neighboring localities, thus putting the poor's most abundant asset, their labor, into most effective use.

B. Health Impact

5.6 Water supply and sanitation improvement projects are commonly justified on the basis of improvements in health resulting from an expected reduction in the incidence of diarrheal diseases and other water related diseases. Until recently, evidence of this relationship has proven elusive to substantiate. A recent rigorous study of the impact on diarrheal diseases of a water, sanitation and hygiene education project in Bangladesh showed a reduction in the incidence, severity and persistence of diarrheal diseases, in all age groups, and in each season of the year, as a result of each of the three interventions. Even more recently, a study reviewing some 144 projects around the world clearly illustrated the impact of water supply and sanitation improvements on six of the most prevalent water related diseases (diarrheal diseases, guinea worm, hook worm, trachoma, schistosomiasis, and ascariasis). Furthermore, the report concluded that the most effective intervention was the provision of a sanitary latrine, and of next greatest importance was making more water available and more accessible so that people are better able to keep themselves and their home environments clean. Supply of water of improved quality is also, of course, important for prevention of disease transmission which results from drinking contaminated water. Available evidence from project provinces suggests however that poor hygiene and disease transmission by flies and other insect vectors, are of greater importance. The health and hygiene education component will focus on conveying these messages. There is increasing evidence that the incidence of water related diseases among farmers who collect and apply human wastes to their crops is higher that for the rural population as a whole. Because the use of nightsoil in agriculture is so widespread, it is essential that these practices are improved and made more hygienic. The most effective solution is to construct latrines which store wastes until they are no longer a hazard to health. A study is to be carried out of nightsoil practices, and of the attitudes of farmers to changes in nightsoil use and to improved types of latrines.

C. Environmental Impact

5.7 The project would have a positive impact on the environment through improved practices for the disposal of human wastes, construction of enclosures for animals, collection and compost of manure (particularly pig wastes), drainage improvements, and monitoring of water quality.

5.8 Increased wastewater quantities as a result of improved water supply could have a negative impact on the environment of the community. However, the quantities of water to be delivered from yard taps, stand-

posts and handpumps would generally be too small to generate sufficient quantity of wastewater to pose environmental problems. Drainage improvements would be constructed wherever wastewater quantities pose problems.

5.9 The most often cited environmental risk with on-site sanitation facilities is the contamination of groundwater. This risk is considered minimal as NPHCCO does not currently permit latrines designed to leach liquid to the soil. (In rural areas, wastes are removed and used in agriculture). Additional safety factors are the low density of housing (and hence waste quantities) in many project areas, the use of deep-well handpumps which do not draw from shallow groundwater, and the effectiveness of soil percolation to render harmless the small quantities of wastewater which may find its way into the ground. Existing shallow wells would be protected where necessary by construction of improved aprons and by removal of any source of contamination (e.g. drainage channels, manure piles, latrines) within close proximity to the well.

5.10 Use of improperly protected water sources could also be harmful to the community. Design criteria for water source development would ensure that adequate protection measures are taken. In addition, water quality would be monitored to ensure compliance with established water quality standards.

5.11 The provision of a safe and reliable water supply, improved environmental sanitation facilities, and intensive health and hygiene education programs is expected to result in a substantial improvement in awareness of environmental quality. The initial focus on "model" villages is also expected to result in a degree of competition in promoting improved environmental quality. Environmental units of the local governments would be involved in the preparation, screening and implementation of the project. Sub-projects would be too numerous to be the subject of separate environmental assessments. Instead, they would be screened against an agreed checklist to be drawn up at design stage to ensure environmental concerns are adequately addressed.

D. Impact on Women

5.12 Although no statistics are available to demonstrate that village women in China are the main carriers of water, they would be the leading beneficiaries of the project as women are usually the main users of water, and to a large extent are responsible for hygiene practices within the family. The project would focus on enhancing women's awareness for hygiene, sanitation and safe water practices.

5.13 During project preparation, the subject of women in development did not draw much attention nor result in substantive discussions. As a starting point for IDA to better understand gender issues in project related matters, the affordability and willingness survey to be conducted in connection with RWS would be designed to also cover women in development issues (para. 4.13). In addition, gender disaggregated data on staffing

and training would also be collected during monitoring of the proposed project. This will be part of the reporting requirements described in paras. 3.40 and 3.41.

E. Institutional Development

5.14 The proposed project would enhance community participation and bring together various government departments concerned in the sector to work towards a common goal in a coordinated fashion. RWSS would provide for: management capacity building at the national, provincial, prefecture and county levels; preparation and dissemination of various technical manuals and guidelines throughout the country; development of workable long-term investment strategies and plans at the county and provincial levels; and technical assistance and training. All these would enhance the effectiveness and sustainability of growth and progress in the sector.

F. Risks

5.15 Shortage of qualified personnel in project management and implementation might hamper progress. The country's policies on self-reliance and cost recovery concerns might block poor communities from participating and limit investment in the sanitation and health education components. The project addresses these risks by: (a) strengthening management and provision of technical assistance and training for all implementing agencies; (b) production and dissemination of "user-friendly" manuals; (c) establishment of review criteria for sub-project selection; (d) promoting community participation including women, and commitment from the start and through every stage of sub-project planning and implementation; and (e) development of long-term strategies and sustainable investment programs for sanitation and health/hygiene education.

VI. AGREEMENTS REACHED AND RECOMMENDATION

A. Agreements Reached

6.1 During negotiations, assurances were obtained from China that:

(a) the National Project Office would be maintained with qualified staff in adequate numbers (para. 3.4);

(b) comprehensive project implementation programs for the following year would be prepared and submitted to IDA for review and approval no later than October 15 of each year (para. 3.18);

(c) review and approval of sub-projects by NPO would follow established criteria and procedures (para. 3.19);

(d) provincial Revolving Accounts would be opened and maintained with an allocation to cover about three months of local cost expenditures (para. 3.39); and

(e) project cost accounts would be audited annually by independent auditors acceptable to IDA and audit reports would be submitted to the Association within six months after the end of each financial year (para. 4.16).

6.2 During negotiations, assurances were obtained from the provincial governments on the following:

(a) proceeds of the IDA credit would be onlent from the provinces to the sub-project entities through project counties at fixed interest of four percent per annum for 20 years including up to five years grace and foreign exchange risk would be borne by the provinces (paras. 2.8-2.9);

(b) the various project offices would be maintained with qualified staff in adequate numbers (para. 3.4);

(c) provincial project implementation programs for the following year would be prepared and submitted to the NPO for review and approval no later than September 1 of each year (para. 3.18);

(d) planning and design of sub-projects would be done in accordance with the criteria contained in the planning and design manuals and the criteria and procedures for review and approval of sub-projects would be followed (para. 3.19); and

(e) water charges for all sub-projects would cover operations and maintenance costs plus the pro-rated portion of the amount to be repaid by the province to the borrower not covered by government subsidies, and O&M costs and depreciation after the debt has been amortized (para. 4.7).

B. Understandings Reached

6.3 Understandings were reached on the following and recorded in the minutes of negotiations:

(a) timetable for finalization and submission of national, provincial and county proposals (para. 3.8);

(b) an implementation plan covering the period from project effectiveness to December 31, 1992 would be prepared and submitted to IDA by April 15, 1992 (para. 3.18);

(c) content and format of semi-annual progress reports and timing for their submission to the Association (paras. 3.40-3.41); and

(d) content and format of annual audit reports (para. 4.16).

C. Condition of Credit Disbursement

6.4 Satisfactory publication and distribution of design manuals for low-cost rural water supply technologies and rural sanitation facilities would be a condition of credit disbursement for civil works (para. 3.9).

D. Recommendation

6.5 On the basis of the project justification and with the above assurances and understandings, the proposed Rural Water Supply and Sanitation project would be suitable for an IDA credit of SDR 78.9 million (US$110.0 million equivalent) on standard terms with 35 years maturity to the People's Republic of China.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

The Project Areas

1. The proposed project will cover 75 counties in six provinces. General features of the project provinces are as follows:

I. Guangxi Zhuang Autonomous Region

2. The Guangxi Zhuang Autonomous Region (Guangxi) is located in the south west of China. It borders with the provinces of Guangdong, Hunan, Guizhou and Yunnan, and Vietnam in the south west. Total area amounts to about 0.24 million square kilometers. The topography of Guangxi is higher at the northwest and lower at the southeast, with flat plain along the coast. Mountains and hilly land make up about 85% of the total land area. The remaining 15% is plains.

3. Guangxi is in the sub-tropical region where its weather pattern is influenced by monsoons. It enjoys relatively warm temperature and abundant rainfall. Temperature ranges from below freezing to around 40C at the extremes. Annual precipitation ranges from 1,100 mm to 2,800 mm. Due to geographical and topographical conditions, rainfall does not distribute evenly across the region. On the average, rainfall during July and August makes up about 60% of the annual total. The monsoon season starts in April and ends in October. Due to this uneven distribution of rainfall, draught and flood occur often.

4. At the end of 1989, Guangxi had under its jurisdiction 14 prefectural level administrations: 5 provincial administered cities (with 8 counties under them), 1 port district, and 8 prefectures (with 75 counties or county level cities under them). Under the county level, there were 1,356 townships made up of about 14,760 administrative villages which in turn were made up of about 69,500 natural villages. Total population in 1989 was about 41.5 million, of which about 34.4 million (or 83%) was rural. There was a total of about 7.3 million households, average family size was 5.0 persons. Average provincial rural income for 1989 was RMB Y483 per capita, average income of project counties ranged from RMB Y236 to Y507.

5. Guangxi is one of five ethnic minority autonomous regions in China. It is also one with the largest ethnic minority population. There are about 11 minority nationalities, among them Zhuang, Yao, Miao, Tong, Yilao, Maonan, Jing, Shui, Yi and Hui. Total minority population is about 16.2 million or 39% of total population. There are 12 ethnic minority autonomous counties. Among the 9 project counties, 5 of them have more than 66% of ethnic minorities.

II. Yunnan Province

6. Yunnan Province is at the southwest border of China and is a mountainous province. The mountains and hilly land make up about 94% of total land area with basin and delta making up the balance. The topography is higher at the northwest, and lower at the southeast. The highest point in Yunnan is the Meili Snow Mountain at about 6,740 meters above sea level.

7. The province is located at low altitude, it is topographically complicated and exhibits many different types of weather conditions. Temperature ranges from 6C to 22C, with great variation during the day and relatively little variation throughout the year. Yunnan has plenty of precipitation but it is unevenly distributed. Still, most areas have over 1,000 mm rainfall each year.

8. At the end of 1989, Yunnan had under its jurisdiction 17 prefectural level administrations, with 127 counties under them. Total population was about 36.5 million, of which 32.0 million (or 88%) were rural. Average provincial rural income for 1989 was RMB Y460 per capita, average income of project counties ranged from RMB Y162 to Y431.

9. There are 46 ethnic minority nationalities in Yunnan, making up about 33% of the total population. Among minority them, Yi has the largest number amounting to about one third of the total minority population. Most of them live in the Chuxiong and the Red River prefectures. The second largest minority is Bai, and they are concentrated in the Dali prefecture.

III. Hunan Province

10. Hunan Province borders with the provinces of Jiangxi to the east, Guangxi and Guangdong to the south, Sichuan and Guizhou to the west, and Hubei to the north. Total area amounts to 0.21 million square kilometers. Mountains and hilly lands make up more than 80% of total land areas.

11. The province is in the sub-tropical region where its humid weather is mainly the result of seasonal monsoons. Temperature ranges from freezing to over 40C. Annual rainfall ranges from 1,250 mm to 1,750 mm. About 40% of precipitation occurs between April and June. Droughts in the fall are common.

12. At the end of 1989, Hunan has under its jurisdiction 14 prefectural level administrations: 8 provincial administered cities, the Tujai and Miao Minority autonomous region, and 5 prefectures with a total of 125 counties or county level cities below them. Under the counties, there were 3,488 townships made up of about 47,400 administrative villages. Total population was about 60.7 million of which about 51.0 million (or 84%) was rural. Total population of the province ranks seventh in the nation. Average provincial rural income for 1989 was RMB Y547 per capita, average income of project counties ranged from RMB Y199 to Y779.

13. There are over 50 ethnic minority nationalities in Hunan. Total minority population is about 4.8 million or about 8% of the total population. There are 17 minority autonomous counties (cities) in Hunan, most of them are in the mountainous regions in the south and west.

VI. Gansu Province

14. Gansu Province is located at the mid-west of China. It borders with the provinces of Shaanxi to the east, Sichuan to the south, Qinghai and Xingjiang to the west and Ningxia, Inner Mongolia and the People's Republic of Mongolia to the north. Total area amounts to 0.45 million square kilometers.

15. The inland province is in the middle latitude regions. Its temperature is subject to large daily and seasonal fluctuations and the area is arid. Temperature ranges from -12C to 25C. Annual precipitation ranges from 30 mm to 860 mm and is obviously unevenly distributed. The amount of precipitation decreases from southeast to northwest. Rainfall during the summer (June to August) accounts for about 60% of the annual total. Precipitation in the winter months is rare. On the other hand, due to the dryness of the air, evaporation is significant. Annual rate ranges from 1,100 mm to over 3,000 mm, increasing from southeast to northwest.

16. At the end of 1989, Gansu had under its jurisdiction 14 prefectural level administrations with 86 counties and county level cities under them. Under the counties, there were 1,539 townships made up of about 17,540 administrative villages which were in turn made up of about 122,670 natural villages. Total population in 1989 was about 21.7 million of which about 18.3 million (or 84%) was rural. Average provincial rural income for 1989 was RMB Y376 per capita, average income of project counties ranged from RMB Y266 to Y477.

17. There are many ethnic minority nationalities in Gansu, among them Hui, Tibetans, Dongxiang, Yugu, Man, Baoan, Mongolia, Hasha and Hasak. Total minority population is about 1.9 million or about 9% of the total population. They are concentrated in six ethnic minority autonomous counties.

V. Nei Monggol (Inner Mongolia) Autonomous Region

18. The Nei Monggol Autonomous Region (Neimong) is located in the south-east of the Mongolia Plateau in the north of China. The region spans 3,400 km east-west and 1,700 km north-south. It borders with Heilongjiang, Jilin, and Liaoning Provinces to the east, Hebei, Shanxi and Shaanxi to the south, Gansu and Ningxia to the west, and the Soviet Union and Mongolia to the north. Total land area amounts to 1.18 million square kilometers, including 4.9 million hectares of cultivated land and 86.7 million hectares of grassland, ranking the largest in the country. More than half of land area are over 1,000 meters above sea level.

19. Most areas of Neimong which are in the mid-latitude region, suffer from very little and unevenly distributed rainfall, and great temperature fluctuations between winter and summer. Temperature ranges from -30C to 27C. Due to topographical differences, annual precipitation ranges from about 500 mm in the east to only about 50 mm in the west. The amount of evaporation increases from 1,000 mm in the east to 3,000 mm to the west. Draughts are common. Sunlight is abundant and amounts to an average of 3,400 hours per year. In most areas, frost free period ranges from 80 to 150 days per year. Winters are very long and harsh; summers are often short and mild, with high concentration of rainfall.

20. The Inner Mongolia Autonomous Region was established on May 1, 1947. At the end of 1989, Neimong had under its jurisdiction 12 prefectural level administrations: 4 provincial administered cities and 8 leagues with a total of 100 counties, banners and county level cities under them. Total population in 1989 was about 20.9 million of which 14.0 million (or 67%) was rural. Average provincial rural income for 1989 was RMB Y500 per capita, average income of project counties ranged from RMB Y240 to Y700.

21. The region is also made up of many ethnic minority nationalities such as Mongolian, Hui, Man, Dekar, Korea, Erwenke and Erkuenlong. Mongolian, the largest minority group accounts for about 3.1 million or about 15% of the total population.

VI. Xinjiang Uygur Autonomous Region

22. The Xinjiang Uygur Autonomous Region (Xinjiang) is located in the northwest of China. There are three mountain ranges in the region: Altay to the north, Kunlun to the south, and Tianmu running east-west in the middle dividing Xinjiang into southern and northern regions. It borders with the Soviet Union, Mongolia, Afghanistan, Pakistan, and India, and is an important passage between Asia and Europe. Total land area is about 1.7 million square kilometers, about one sixth of the total national territory.

23. The inland region is far away from oceans. Its climate is, as a result, typical continental. As with Gansu, the region has very little precipitation but evaporation is considerable. Daily and seasonal temperature differences are vast. Temperature ranges from -40C to 40C in extreme cases. Average annual rainfall is about 145 mm while evaporation is often more than 2,000 mm.

24. At the end of 1989, Xinjiang had under its jurisdiction 14 prefectural level administrations: 8 provincial administered cities, one autonomous region and 5 prefectures with a total of 86 counties and county level cities under them. The Agricultural Reclamation Company (comprising mainly of state farms) is an enterprise under the direct supervision of the Ministry of Agriculture. In Xinjiang, the Company is under the dual leadership of the Ministry and the Xinjiang government. At the end of 1989, there were 13 agricultural branches, and an industry and construction

branch under this general company. The 172 state farms under these branches were scattered in 57 counties/cities of the region. Total population of Xinjiang in 1989 was 14.5 million of which 10.5 million (or 73%) was rural. Average provincial rural income for 1989 was RMB Y496 per capita, average income of project counties ranged from RMB Y305 to Y748.

25. Xinjiang, as an autonomous region is made up of many ethnic minority nationalities. The Uygurs, the dominate ethnic group, make up about 47% of the total population. They are mainly concentrated in 5 prefectures around the Turfan Basin, Yili and Urumqi areas. Other ethnic minority nationalities include Hasak, Hui, Kurk, Mongolian, Russian and many others. The Hans, majority in other provinces of China, comprise about 38% of the total population of Xinjiang.

ANNEX 2

CHINA

RURAL WATERS SUPPLY AND SANITATION PROJECT

List of Project Provinces, Prefectures and Counties

Province	Prefecture	County
Guangxi	Nanning	Fusui
		Longan
	Liuzhou	Laibin
	Bose	Pingguo
	Qinzhou	Qinzhou
	Guilin	Yangshuo
	Wuzhou	Cenxi
	Yulin	Guigang
	Hechi	Duan
	(8)	(9)
Yunnan	Qujing	Qujing
	Zhaotong	Qiaojia
	Baoshan	Baoshan
	Lincang	Yunxian
	Honghe (Gejiu)	Mile
	Dali (Xiaguan)	Weishan
	Chuxiong	Chuxiong
	(7)	(7)
Hunan	Zhuzhou	Chaling
	Hengyang	Hengdong
		Hengshan
	Shaoyang	Chengbu
	Yueyang	Yueyang
		Huarong
	Changde	Linli
		Anxiang
	Yiyang	Nanxian
	Loudi	Xinhua
	Chenzhou	Jiahe
		Chenxian
	Lingling	Jianghua
		Jiangyong
	Huaihua	Chenxi
		Qianyang
	Xiangxi (Jishou)	Yongshun
		Fenghuang
	Dayong	Sangzhi
	(12)	(19)

Province	Prefecture	County
Gansu	Dingxi	Lintao
		Tongwei
	Baiyin	Huining
		Jingyuan
	Pingliang	Pingliang
	Qingyang	Zhenyuan
	Zhangye	Minle
	Tianshui	Beidao
		Qincheng
	Longnan	Huixian
	Wuwei	Wuwei
	Linxia	Linxia
	Gannan	Xiahe
	Lanzhou	Yongdeng
	(11)	(14)
Neimong	Zhelim (Tongliao)	Tongliao
		Naiman
	Hulunbir (Hailar)	Arun
	Chifeng	Linxi
	Ekzao (Dongsheng)	Dalad
		Ejin Horo
	Hohhot	Tumd Zuo
		Togt (Togtoh)
		Hohhot Suburb
	(5)	(9)
Xinjiang Region	Hotan	Moyu
		Hotan
	Kashi	Shule
		Shache
	Kezelesu (Artux)	Akto
	Aksu	Kuqa
	Bugur (Korla)	Luntai
	Turfan	Toksun
	Bortala	Jinghe
	Altay	Altay
	(8)	(10)
Xinjiang State Farms	Aksu	Aksu
	Kashi	Kashgar (Kashi)
	Bole	Bole
	Wujiaqu (Changji)	Wujiaqu
	Kuytun	Kuytun
	Shihezi	Shihezi
	Altay	Beitun
	(7)	(7)

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

The Water Supply Component

Existing Situation

1. The water supply situation in the project area display diverse features due primarily to climatic and hydrogeological differences prevailing in the provinces. The northern provinces of Xinjiang, Inner Mongolia and Gansu are generally dry and barren with distinct water shortages and often poor quality supplies. The southern provinces of Guangxi, Yunnan and Hunan, however, exhibit milder climate with increased rainfall and generally available water resources. Some of the poor and remote communities in the southern provinces also suffer from lack of easily accessible water supplies. Existing coverage levels are also indicative of the extent of rural population's access to safe water supply averaging about 27% in the project counties. The coverage levels range from 11% in Inner Mongolia to 37% in Guangxi resulting in an unserved/underserved rural population of about 20 million in the 75 project counties. Total rural population in the project areas amount to about 27 million. Table 1 gives the existing and proposed coverage levels in the project counties.

Coverage Levels

2. The proposed project will serve an additional population of about 9 million in the project area thus bringing the total population served with safe water supply from an existing coverage level of 7.4 million to about 16.4 million corresponding to 60% of the total population in the project counties. It is to be noted that the service provided will be based predominantly on community water supply systems. Consequently, about 96% of the piped-water service will be through public standposts which is in contrast to the Rural Water Supply Project where the majority of the piped systems had house connections. Aiming for a higher coverage in the project areas, the standposts offer an appropriate and economic solution to village water supply needs as compared to individual house connections. In view of the prevailing conditions and localities, 26% of the targeted population in Inner Mongolia would be served through house connections.

Piped Water Supply Systems

3. Among the service levels proposed, the piped systems constitute the largest proportion of water supply systems making up about 90% of the total component cost. About 7.8 million additional rural population is planned to be served by piped systems leaving about 1.2 million to be served through point sources. A total of about 2800 piped systems will be

constructed of which about 1450 are proposed through motor-driven deep wells, 950 spring sources and 400 from surface waters. In the preparation of the provincial proposals, spring development and well construction were given higher priority over surface water development mainly because of the higher costs involved in the treatment processes for surface water supplies. Among sources of piped-water systems, spring water sources are usually of good quality and no treatment is necessary. Although the construction costs per person are somewhat higher for the piped-water surface, certain advantages were considered in terms of reliability, quality/quantity, convenience, and operation and maintenance. In a number of spring water supply schemes where high source yields are available, regional (multi-village and even cross-country) systems have been adopted to feasibly serve larger populations through a reliable single source by increasing efficiency and economy of scale.

Point Water Sources

4. The proposed project contains also alternative low-cost water supply technologies (point sources) such as shallow and deep wells with handpumps providing affordable solutions to the poor communities. The deep well handpump which could draw drinking water from depths up to 50-60 meters is, indeed, an appropriate technology serving about 30 families from a single handpump. This type of handpump is manufactured in China (Type XI-II) based on the successful model, India Mark II. A total of about 4400 deep well handpumps are proposed to be constructed. Xinjiang and Inner Mongolia provinces have had considerable experience through the UNDP/World Bank Project CPR/88/011 (Low-Cost Rural Water Supply and Sanitation Project), and the total of handpumps proposed by these two provinces amounts to about 80% of the total number proposed. It is, therefore, presumed that the introduction of this type of alternative technology in the other provinces will serve the purpose of replicability aiming for a larger coverage in the rural populations. Regarding the type of the shallow well handpump drawing water from 7 to 10 meter depths, it was agreed to use self-priming type to prevent contamination of the well. Alternatively, the XI-II deepwell handpump can also be used with a cylinder setting of about 12 meters. A total of about 15,000 shallow wells with handpumps are proposed mostly in Gansu and Guangxi Provinces.

5. About 53,000 rainwater collectors are proposed to be constructed under the proposed project. Planned to meet the water supply demand of rural communities in specific areas of Yunnan and Gansu Provinces where surface and groundwaters are not available, the rainwater collectors or cisterns offer the only alternative solution in providing drinking water. It was agreed to improve the design of the collectors and provide sanitary protection against contamination. Table 2 gives the breakdown and details of the piped and non-piped systems by provinces.

Planning and Design Criteria

6. The piped water supply systems proposed in the project have been selected as the least cost solutions. The criteria used in the design of

the piped systems are based on the Rural Water Supply Manual prepared in 1984 by NPHCC for the First Rural Water Supply Project. Accordingly, per capita water consumption is assumed to range between 40 and 70 liters per day depending on the sufficiency of the water sources and the climatic conditions. For animals and other use, a consumption allowance of 10 liters is used. For point sources 30 to 40 liters per capita per day are considered adequate. A design period of 15 years is selected and the annual population growth is taken as 1.2%. A daily peak factor of 1.5 is used and the maximum hourly demand is taken to vary from 2.5 to 4.0. A supplemental manual for rural water supply and sanitation covering the planning and design of non-piped water systems is also prepared in September 1991.

System Unit Costs

7. A comparative review of the base costs has revealed that per capita investment cost for piped systems averaged about RMB Y75. According to NPHCC standards and Bank experience elsewhere, this level of investment is considered comparable to low-cost water supply systems. Unit costs of the shallow and deep well handpump installations, however, varied between the provinces and even among the counties. For deep well handpump systems, per capita costs varied from about RMB Y20 in Inner Mongolia to RMB Y70 in Guangxi. Although differences in unit costs can be expected due to varying well depths and drilling geological formations, it was agree with GOC to reconcile the inconsistencies.

Water Quality Issues

8. Bacteriological contamination of unprotected water sources with faecal matters causing water-borne and excreta related infections is common through the project area. For point sources, sanitary protection of the facilities and the education of the communities will maintain the quality of the low-cost water sources. On the other hand, presence of fluoride compounds in drinking water from groundwater sources poses a major problem causing endemic fluorosis (discoloring of the teeth and in severe cases skeletal deformities). A majority of the project counties in Gansu, XUAR and IMAR has been effected and proposals contained solutions to partly alleviate the problem. Treatment to remove such undesirable dissolved organic matter in water is difficult, requires high costs and operation and maintenance at the village level may not be possible. The proposals, therefore, contains solutions attaching priorities to finding other sources. Consequently, in most cases the achievement will be through development of other water sources with acceptable level of fluorides. Data on areas and population effected by water sources with high fluoride content was not available at the time of appraisal to make a true assessment of the situation. In Neimong, for example, 650,000 rural people suffer from drinking water with high fluorides (up to 6-8 mg per liter, and national standard and WHO guideline limit the acceptable level 1.5 mg) in all project counties and only 45% coverage is proposed.

Water Quality Surveillance and Monitoring

9. The proposed program for drinking water quality surveillance and monitoring is directed towards strengthening the capability of the provincial and county governments and is considered adequate. Monitoring of the point sources may not be feasible nor economic, however, control of the drinking water quality from point sources requires other interventions in addition to supply of laboratory equipment and related training in sampling and analysis. Provision of sanitary protection of the facilities is equally important in maintaining the water quality.

Table 1: Water Supply Service Coverage

Province	Total Number of Counties	Total Rural Population (million)	Project Counties	Population in Project Counties (million)	Existing Coverage in Project Counties (million)	(%)	Additional Population Served by RWSS (million)	(%)	Total Population to be Served (million)	(%)
Guangxi	83	36.4	9	5.41	1.81	34	2.00	41	3.81	78
Yunnan	86	32.0	7	3.09	0.94	30	1.27	41	2.21	72
Hunan	125	51.0	19	8.65	2.48	29	2.20	25	4.69	54
Gansu	86	18.3	14	4.98	0.64	13	1.35	28	1.99	40
Neimong	100	14.0	9	2.37	0.27	11	1.00	42	1.27	54
Xinjiang	86	10.5	17	3.53	1.24	35	1.25	35	2.49	71
Total	566	162.2	75	28.03	7.38	26	9.07	33	16.46	60

Table 2: Water Supply Program

	Guangxi			Yunnan			Hunan			Gansu			Neimong			Xinjiang			TOTAL		
	#	Pop ('000)	Cost (Y mln)	#	Pop ('000)	Cost (Y mln)	#	Pop ('000)	Cost (Y mln)	#	Pop ('000)	Cost (Y mln)	#	Pop ('000)	Cost (Y mln)	#	Pop ('000)	Cost (Y mln)	#	Pop ('000)	Cost (Y mln)
A. First Year Program																					
(1) Piped																					
(a) HH Connection																					
Surface	-	-	-	1	5.8	0.5	-	-	-	-	-	-	-	-	-	-	-	-	1	5.8	0.5
Spring	-	-	-	-	-	-	-	-	-	-	-	-	2	2.2	0.2	-	-	-	2	2.2	0.2
Well	-	-	-	-	-	-	-	-	-	-	-	-	14	33.3	2.7	-	-	-	14	33.3	2.7
(b) Standpipes																					
Surface	5	41.1	2.8	3	31.6	3.2	17	90.3	6.1	3	50.5	4.0	-	-	-	20	7.7	0.8	48	221.1	16.9
Spring	6	38.5	2.7	9	100.9	7.5	13	46.1	2.5	6	24.0	1.7	-	-	-	1	7.0	0.5	35	217.5	14.9
Well	17	127.2	8.7	2	7.7	0.8	18	107.9	7.8	22	88.3	6.1	14	23.6	1.7	20	64.4	5.8	93	419.1	30.8
Subtotal	28	206.8	14.2	15	146.0	12.0	48	244.3	16.4	31	163.7	11.8	30	59.1	4.6	41	79.1	7.1	193	699.1	56.1
(2) Non-piped																					
SWHP	100	3.0	0.1	-	-	-	-	-	-	61	0.3	0.1	-	-	-	237	1.3	0.1	398	4.6	0.3
DWHP	72	16.7	1.1	32	5.7	0.2	30	7.6	0.4	5	1.1	0.1	135	26.6	0.8	358	64.9	3.3	632	112.5	5.9
Cisterns	-	-	-	3,170	15.9	1.2	-	-	-	2,997	15.0	1.0	-	-	-	-	-	-	6,167	30.9	2.2
Subtotal	172	19.7	1.2	3,202	21.5	1.4	30	7.5	0.4	3,063	16.4	1.2	135	26.6	0.8	595	66.2	3.4	7,197	147.9	8.4
TOTAL	200	226.6	15.4	3,217	167.6	13.4	78	251.8	16.8	3,094	180.1	13.0	165	85.7	5.4	636	135.3	10.5	7,390	1,047.1	74.5
B. Total Project																					
(1) Piped																					
(a) HH Connection																					
Surface	-	-	-	1	5.9	0.5	-	-	-	-	-	-	-	-	-	-	-	-	1	5.9	0.5
Spring	-	-	-	1	5.7	0.5	-	-	-	-	-	-	10	14.9	0.8	-	-	-	11	20.6	1.3
Well	-	-	-	1	5.8	0.3	-	-	-	-	-	-	165	308.2	23.8	-	-	-	166	314.0	24.1
(b) Standpipes																					
Surface	98	594.0	40.9	62	437.0	45.5	157	748.5	50.4	23	354.7	27.8	-	-	-	63	128.5	13.1	403	2,260.7	177.7
Spring	84	512.5	35.3	486	539.4	40.2	229	547.5	29.5	135	211.1	14.8	-	-	-	3	10.5	0.8	937	1,821.0	120.6
Well	236	753.7	51.5	51	100.1	10.5	191	888.0	62.9	212	552.4	38.3	457	585.4	41.6	180	553.9	50.1	1,306	3,415.5	254.9
Subtotal	417	1,860.2	127.7	802	1,093.9	97.5	577	2,182.0	142.8	370	1,118.2	80.9	632	908.6	66.2	226	694.9	64.0	2,824	7,837.7	579.1
(2) Non-piped																					
SWHP	3,005	29.4	0.8	-	-	-	-	-	-	10,667	87.6	3.6	-	-	-	1,170	6.8	0.2	14,842	123.8	4.6
DWHP	481	105.8	7.0	82	12.3	0.5	149	37.3	2.0	150	28.9	1.1	1506	328.4	8.7	1,906	297.4	17.8	4,554	808.1	37.1
Cisterns	-	-	-	32,226	161.1	12.6	-	-	-	21,043	112.2	7.2	-	-	-	10	4.7	0.7	53,279	278.0	20.5
Electric Pump	-	-	-	-	-	-	-	-	-	-	-	-	33	19.8	0.8	-	-	-	33	19.8	0.8
Subtotal	3,486	135.2	7.8	32,288	173.4	13.1	149	37.3	2.0	31,860	228.7	11.9	1539	348.2	9.5	3,086	308.9	18.7	72,708	1,229.7	63.0
TOTAL	3,903	1,995.4	135.5	32,890	1,267.3	110.6	726	2,199.3	144.8	32,230	1,346.9	92.8	2471	1,254.7	75.7	3,312	1,003.8	82.7	75,532	9,067.4	642.1

Note: Figures may not total exactly due to rounding

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

The Sanitation Component

Rationale

1. The sanitation and health education components have been included in the project in recognition of their importance to complement water supply improvements if maximum health benefits are to be realized. However, because of limited budgets, the project will not achieve a significant impact in terms of increased sanitation service coverage. Even in project provinces the service coverage objectives set by the Ten-Year Plan of the NPHCC and the Eigth Five-Year Plan of the Government are unlikely to be achieved. Service coverage will be directly increased in project provinces by between 1 and 5% by 1996, well short of objectives for years 1995 and 2000. It is clear that government resources cannot possibly finance sanitation improvements on the scale required to meet those targets. The main objectives of the sanitation component of the project are therefore to: (a) establish programs, initially in project counties, in each province which can continue and expand in future; and (b) establish and demonstrate a rural sanitation strategy in each province which can achieve the national objectives without making unrealistic demands on government financing. Draft rural sanitation strategies were prepared in 1989 in Xinjiang and Inner Mongolia Autonomous Regions with assistance from the UNDP financed CPR/88/011 project (text para. 1.42). These will be used as models for similar strategies to be prepared for the other four provinces. Separate provincial strategies are demanded by the widely varying conditions encountered. Project CPR/91/141 Capacity Building and Investment Preparation for Rural Water and Sanitation in Poor and Remote Areas will provide assistance in achieving these objectives (Annex 11).

2. One of the most important factors to be considered is the almost universal practice of utilizing human waste (nightsoil) in agriculture as fertilizer and soil conditioner. Preferences and practices vary considerably but the evidence suggests that rural communities everywhere, and especially the farmers engaged in these practices, suffer significant health consequences as a result, particularly ascariasis (round worm) which is very widespread. Improvements are clearly needed, as nightsoil use will undoubtedly continue, most obviously by utilizing latrines which store wastes until they are safe to handle. However, the acceptability of latrine types, and changes in waste utilization practices, will depend primarily on farmer's attitudes. A representative study is therefore to be carried out to provide a better understanding of attitudes, practices and how to better protect the health of farmers and their families from the diseases resulting from poor sanitation. An outline terms of reference is provided as Annex 8.

3. Latrine and nightsoil use practices are the main but not the only elements of the sanitation component. The effectiveness of a sanitary latrine

in an unsanitary household is likely to be greatly diminished and so efforts will be made to improve the whole environment of rural households. Animals will be penned, their manure composted in pits, and wastewater drained away. Changes in sanitation practices will be encouraged by intensive health and hygiene education under a separate project component. School latrines will be reconstructed or built to reinforce in practice the lessons taught in the classroom, new types of household latrines will be demonstrated at schools for use by teachers, and public latrines will be built in more densely crowded areas where the need exists.

Component Description

4. The sanitation component is centered on household latrine construction but also includes public and school latrines, domestic animal enclosures, manure composting pits, drainage ditches, biogas generators, protection of existing water sources, and nightsoil handling equipment if required. Because of the limited experience in China both with indigenous latrine designs and those developed overseas, all proposed types will be constructed during the initial two years of the project and their performance and acceptability evaluated. All designs will be built in accordance with the Sanitation Manual prepared by the NPHCCO, which provides typical designs for latrines meeting established interim guidelines including control of flies, freedom from excessive odor, non-leaching, and with specified minimum retention times. A national standard could be prepared based on this review to complement the standard for treatment of collected nightsoil. The agreed first year program and outline program for the sanitation component is given in Table 1.

Implementation

5. Implementation will be the primary responsibility of County Project Offices, each of which has a Sanitation Section. Provincial Project Offices will assist and coordinate county programs. Implementation will be focussed initially on 150 "model villages", one or more in each project county, which have been selected for intensive promotion and a high level of sanitation improvement so that a reasonable impact is demonstrated. The sanitation program will then expand to the surrounding regions, the model villages serving as examples to be followed. Funds are available only for a small number of latrines to be constructed in other villages for training and demonstration purposes. However, financing and cost recovery policies to be developed are expected to result in significant levels of cost recovery and beneficiary contributions which will enable a greater number of latrines to be built and for the program to continue and expand with limited future government contributions. The CPO's, which are to remain operational after project completion, will manage the on-going sanitation programs.

Table 1: Sanitation Program

	Guangxi		Yunnan		Hunan		Gansu		Neimong		Xinjiang		TOTAL	
	#	Pop ('000)	#	Pop ('000)	#	Pop ('000)	#	Pop ('000)	#	Pop ('000)	#	Pop ('000)	#	Pop ('000)
A. First Year Program														
1. Latrines														
Schools	10	1.5	9	6.0	12	4.5	41	16.9	15	7.5	7	5.7	94	42.1
Public	7	NA	7	NA	1	NA	8	NA	10	NA	22	NA	55	NA
Household	2,519	12.5	867	4.3	2,847	11.4	2,912	14.6	1,303	6.5	773	4.0	11,221	53.3
Subtotal	2,536	-	883	-	2,860	-	2,961	-	1,328	-	802	-	11,370	-
2. Animal Enclosures	1,663	-	700	-	1,894	-	2,814	-	1,303	-	51	-	8,425	-
3. Other														
Garbage Dump	813	-	231	-	1,002	-	-	-	-	-	10	-	2,056	-
Drainage (m)	19,613	-	8,420	-	10,300	-	-	-	-	-	-	-	38,333	-
Not Specified	-	-	-	-	-	-	-	-	492	-	-	-	492	-
B. Total Project														
1. Latrines														
School	197	29.1	120	7.0	163	61.5	342	130.8	59	29.5	105	137.2	986	395.1
Public	80	NA	50	NA	80	NA	62	NA	70	NA	133	NA	475	NA
Household	12,201	61.0	6,859	24.1	11,667	38.0	25,604	97.1	7,892	39.4	4,588	26.4	68,811	286.0
Subtotal	12,478	-	7,029	-	11,910	-	26,008	-	8,021	-	4,826	-	70,272	-
2. Animal Enclosures	1,663	-	1,399	-	7,749	-	6,185	-	7,892	-	1,871	-	26,759	-
3. Other														
Garbage Dump	813	-	259	-	4,282	-	-	-	-	-	222	-	5,576	-
Drainage (m)	19,613	-	14,460	-	36,600	-	-	-	-	-	-	-	70,673	-
Not Specified	-	-	-	-	-	-	-	-	5,285	-	-	-	5,285	-

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

The Hygiene and Health Education Component

Existing Conditions

1. Satisfactory benefits of improved water supply and better sanitation can only be achieved if they are supported by an adequate level of education and training to promote an understanding of the importance of health and hygiene. At the present time health education in rural areas is very limited, often consisting of only the provision of some health education textbooks to primary level students, the distribution of a limited number of hygiene materials to herdsmen, the production of TV and radio programs, and in rare cases the publication of bulletins and newspapers. The health education institutions suffer from both the lack of properly trained and experienced personnel and from severe shortage of funds to design and carry out effective health education campaigns. Similarly, most school teachers are poorly trained in hygiene and health subjects and therefore do not have the knowledge to effectively change the hygiene habits of children. Adults could benefit from hygiene instruction provided by village and hospital doctors, but due to the present compensation system, doctors are limiting their services primarily to the provision of curative services. Community-based and participatory approaches successfully used in many developing countries are rarely applied to hygiene and health education in China. Minority groups requiring information in their own languages, the poorest segments of the rural population, and peasants in remote areas are particularly suffering from unhealthful water and sanitation practices. In addition, the high level of illiteracy in many rural and poor areas, prevents or severely limits the use of conventional health education instruments, such as textbooks, written bulletins and newspapers.

2. Hygiene and health improvements are not only affected by the lack of training and budgetary resources, but also by the fact that long-term hygiene and health education strategies and programs are missing. Activities in the provincial and district health education institutions are often carried out on an ad hoc basis by doctors rather than by health education specialists. To overcome this problem, Hunan Province established in 1987 a specific program for health educators at a medical university with about 90 students expected to graduate per year. Most other project provinces lack such specialized training. As a consequence, due to lack of basic hygiene and health information, preventable water contamination from human and animal waste as well as from excess mineralization, fluorides, heavy metals and industrial pollution often leads to unsanitary conditions far below acceptable standards.

Demand for Hygiene and Health Education

3. All provinces cite the need to reduce the incidence of water-borne diseases as their major objective for improving drinking water. As much as improvements in sanitation are required to yield good benefits from improved water supply systems, health and hygiene education is essential to reap the full benefit of better water and sanitation infrastructure. However, this relationship between disease reduction, sanitation and hygiene/health education is not yet well understood by most government officials, civic leaders and teachers. The proposed project has therefore been designed to demonstrate the benefits of an integral approach of these three areas.

HHE Planning and Investment Programs

4. Hygiene and health education programs designed particularly in the context of improved water supply systems have so far not been used in China. While health education has been carried out by provincial health education institutions, Epidemic Prevention Stations at the county level and by township health centers for a relatively short period of time, their efforts have been severely hampered by budgetary restrictions and lack of adequately trained staff. Long-term strategies and plans for hygiene and health education have been prepared only recently by a few of the provincial health education institutes. Investment programs for hygiene and health education are well below targets recommended by the World Health Organization (3-5% of total health expenditures). In many districts, especially in remote and poor areas, only a nominal amount is made available in their budgets for hygiene and health education and then funds are often provided for personnel expenditures only.

Project Costs

5. The total base project cost of the hygiene and health education component is estimated at Yuan 32.5 million (about US$6.1 million) which amounts to about Yuan 3.5 (US$0.65) per project beneficiary. Although this appears to be low in comparison to water and sanitation projects in other countries, the proposed plans and programs appear to be sound and the provision of the essential organizational framework and physical resources seems adequate. For comparison purposes, it must further be noted that a large portion of hygiene and health education under the project will be carried out at the community level where village doctors receive only very small compensation for their training efforts (Yuan 0.5 per hour) and most of the other village-based activities are on a voluntary basis.

Implementation

HHE Organization

6. The hygiene and health education component will be primarily the responsibility of the provincial public health bureaus and PPHCC with the

assistance of the provincial health education institutes. Project activities will be administered and coordinated by the PPOs. At the district level, the project will be implemented by the district health bureaus with the assistance of the district health institutes; at the county level by the epidemic prevention sections, and, where available, by health centers at the township level. The National Project Office will call for quarterly meetings during the first two project years and semi-annually, or as needed, during the remaining project period. The senior health education officials of the six project provinces will be invited in order to exchange information and thereby benefit from each others knowledge and experience in hygiene and health education. One important aim of these meetings will be to improve the quality and the standardization of hygiene and health education textbooks to be designed, printed and distributed under the project. Within each province, a hygiene and health education working group will meet regularly comprising health educators and other relevant persons representing health education interests at the different levels.

7. Hygiene and health education campaigns, training programs and textbook preparation will be coordinated, and evaluated at the national level by the China Rural Water Supply Technical Center (CRWSTC) and supported, as needed, by the National Health Education Institute which can bring some valuable past experience to this important task. The CRWSTC under NPHCC, which started its operation in November 1991 in the vicinity of Beijing, will conduct specific training classes at the national level in hygiene and health education and carry out critically needed hygiene and health education research for China.

8. Hygiene and health education in rural areas will not be successful using top-down methods only, where most of the training is focused on political leaders, medical personnel and educators. Rather, a two-pronged approach will be used in the project. While guidance to invoke significant changes in hygiene habits must originate from the top by the respective authorities who will also need to provide the necessary conditions in terms of trained personnel and other resources, most of the household level training should be carried out by the villagers themselves through selected community women. These women would be the key trainers for their families and other families alike.

HHE Strategies and Programs

9. The proposed project would include activities aimed at improving professional guidance to the provincial and lower-level health institutions in the area of hygiene education and water-borne disease prevention. The proposed strategies and programs will be targeted towards community leaders, medical personnel and educators. Community support groups (e.g., women organizations) and community-based efforts would receive special attention under the project.

10. In order to devise effective health education programs, each of the project provinces has formulated a specific hygiene and health

education strategy for the project. This strategy sets out the proposed objectives and targets; determines the intended target groups (e.g., families below a certain income level, peasants and herdsmen, minority nationalities, children, mothers, women); determines the degree of participatory versus instructional approach in conveying hygiene and health education messages; selects the principal health education instruments to be applied; proposes the required institutional responsibilities; and decides on knowledge, attitude and practices (KAP) studies as well as on the system of monitoring and evaluation.

11. On the basis of this strategy, each province has prepared a broadly defined five-year hygiene and health education program in support of the project. These programs include activities such as training of trainers and familiarization campaigns for community leaders; writing of training manuals; preparation and instruction of hygiene and health education classes; revision of hygiene and health education textbooks; initiation and implementation of hygiene and health education campaigns for the project; development of health personnel curricula and their implementation; establishment and training of theater groups; and devising and implementing specific media programs. For the first project year of this five-year program, the hygiene and health education activities have been defined in much more detail and then prioritized, thus serving as an actual work program.

12. The project will not rely only on the conventional palette of hygiene and health education instruments to familiarize the project beneficiaries with desirable changes in water and sanitation practices and to change age-old attitudes and hygiene behavior. Since most of the project beneficiaries are poor, not well educated, and may belong to remotely located minority groups who are often apprehensive about outside influences, an intensive and interactive training approach devised by health educators and social scientists with extensive experience with rural and minority populations will be used under the project. The resulting training programs will have a strong participatory content in order to raise awareness, to ensure that the whole community supports the proposed activities, and to pay due regard to the needs of the particular circumstances of each village.

HHE Component Implementation Schedule

13. With the first-year hygiene and health education program clearly defined, the hygiene and health education component can be implemented quickly in parallel with the start-up of the water supply systems and the initial pilot sanitation facilities. During this initial period, most of the training of trainers at the provincial, county and village level will take place. During the following years, detailed annual plans will be prepared and submitted to IDA for yearly review and comment until project completion.

14. Special emphasis will be also be put on the early construction and operation of training facilities and other physical infrastructure

needed to support the hygiene and health education component, such as design studios and office accommodations for health educators who are presently often without adequate work space. The acquisition of TV, video and hygiene and health education materials would only take place after the approval of the detailed annual hygiene and health education program.

Management of HHE Component at all Levels

15. Primary implementation responsibility for the hygiene and health education component lies with either the Public Health Bureaus or PHCCO of each province. Project activities would be administered by PPOs. The health education institutes within these bureaus prepare the long-term and annual programs based on the proposals submitted by each of the 75 project counties. During the implementation of these programs, the leaders at the district, township and village levels, the health and social workers as well as teachers and village hygiene and health education facilitators will play important roles in conveying messages relating to proper water, sanitation and hygiene practices as well as adherence to good health and hygiene standards.

16. At the community level, household visits and group discussions, rather than didactic and theoretical training, would be organized by the community leaders themselves and supervised and monitored by the respective health education institute. At the national level, NPO administers the component while CRWSTC, with the assistance of the National Health Education Institute, guides and coordinates the hygiene and health education activities of all six project provinces.

Supervision by IDA

17. Due to the innovative nature of the proposed approach to hygiene and health education, IDA will have to provide substantially more than average supervision to this project component.

Impact of Hygiene and Health Education

18. The maximum benefits from the project in terms of health improvements can be achieved if the project succeeds in properly integrating the water, sanitation and hygiene and health education components.

19. As women are the main carriers and users of water and to a large extent are responsible for hygiene practices within the family, the proposed hygiene and health education campaigns focus on enhancing women's awareness for hygiene, sanitation and safe water practices. In addition, mothers will be trained as trainers in hygiene and health education for their family and for other families in the village.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

The Technical Assistance and Training Component

Overview

1. As the project is new to the six provinces and the 75 counties selected in this project, technical assistance and training is a most important component in this project. The technical assistance and training will be provided in the new techniques of water supply, sanitation, health education and all aspects of project design, construction planning and management, and system operations and water quality monitoring. The training of the project personnel will start first with training at the national level for their own staff and the provincial trainers and will be followed by training at the provincial for their staff and the county staff and trainers and the then in-turn the county trainers will train their own staff and the village/township staff. Training at the national and provincial levels will form a basis for expanding the program into non-project provinces and counties.

Training

2. The NPO and each PPO and CPO has prepared an overall plan for the implementation of the training and technical assistance at their respective levels. The national program for training includes preparing materials and giving courses in the major ares of: (a) water supply technology; (b) sanitation; (c) health and hygiene education; (d) project management; (e) procurement; (f) manpower development; (g) finance; and (h) water quality testing and monitoring. These courses will be starting during the project preparation and early in the project implementation phases. The necessary training manuals are in the advanced state of preparation. The PPOs and CPOs will be starting their training soon thereafter.

3. In addition to giving about 30 courses and training an estimated 2400 trainees, the NPO will provide the provincial staff with course outlines for conducting their courses, will provide guidance and will review the yearly training plans for the provinces as well as an assessment of the previous year's training program. The NPO plans a yearly meeting, probably in November for about one week, to include the PPO training directors, the NPO training group and authors preparing the course materials. The objective of the yearly meetings are to review the past year's training; to provide guidance for the next year's program; and to review the preparation of newly prepared course materials.

4. Each of the provinces and counties have prepared their training plans based upon sequence of implementation requirements,i.e. design, procurement, project management, finance , operation and water quality monitoring, etc., and on the required staffing at the county levels for the different training specialties. Since the training component is critical to the successful implementation of this project, it was stressed through the project preparation that the training program must fulfill the needs of the project implementation schedules. Since the design institutes will be using new designs for China they will be asked to participate in the relevant training courses as well as other bureaus in the provinces and counties that are associated with the project. The 5-year training programs at the national, provincial and county levels are given in Table 1.

Technical Assistance

5. One of the objectives of the project is to bring new low-cost systems to China that have been developed and tried in other countries. Therefore a necessary input to the program is the advice and review of the water supply systems, sanitation and the health education programs by experts in the respective areas from other countries. The foreign experts would be providing assistance and advice to the national and provincial levels and then local experts would be expected to assume the advisory role for the provincial, county, township and village levels. Local expert will be taking a substantial role in the training activities at all levels. A list of the foreign and local experts required in the project is given in Table 2.

6. A study on alternative handling and disposal of night soil will conducted under this project. An outline terms of reference for this study is in Annex 8.

Table 1: 5-Year Training Program a/

Courses	National		Provincial		Counties	
	Courses	Trainees	Courses	Trainees	Courses	Trainees
Project Management	2	50	15	561	173	3,857
Procurement	3	85	10	396	86	2,747
Financial/Accounting	-	-	22	988	205	5,036
Organization & Management	2	85	5	170	47	1,194
Hydrogeological	2	85	7	260	19	358
Construction Management	-	-	21	755	139	3,793
Materials Control	-	-	7	257	49	1,832
Water Supply Technology	4	340	22	767	175	1,532
Water Quality Monitoring	3	255	20	854	170	2,750
Sanitation	4	340	23	963	299	7,491
Health Education	5	425	48	1,651	392	14,070
Other	5	760	21	407	371	9,205
Total	30	2,425	221	8,029	2,125	53,865

a/ Some courses will have multiple sections.

Table 2: Technical Assistance Component a/

	Guangxi		Yunnan		Hunan		Gansu		Xinjiang		I.M.A.R.		National		Total	
	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
Water Supply	26.00	2.5	10.00	3.0	15.00	2.0	37.0	3.5	20.00	3.0	3.00	3.5	5.0	3.0	116.00	20.5
Sanitation	0.50	1.0	0.50	1.0	0.50	1.0	0.5	1.0	0.25	0.5	0.25	0.5	5.0	3.0	7.50	8.0
Health Educ	18.75	2.0	10.25	2.0	25.25	4.0	19.0	2.0	22.75	3.0	12.75	2.0	7.5	--	116.25	15.0
Project Mgmt	--	--	--	--	--	--	--	--	--	--	--	--	2.5	3.0	2.50	3.0
Total	45.25	5.5	20.75	6.0	40.75	7.0	56.5	6.5	43.00	6.5	16.00	6.0	20.0	9.0	242.25	46.5
Nightsoil Use in Agriculture b/													98.0	6.5		

a/ Figures given in staff-months
b/ Related study not financed under proposed project

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

The Institution Establishment and Project Management Component

1. The institution establishment and project management component would comprise construction of project offices and staff dormitories; provision of vehicles and office equipment; and financing of project management and supervision activities. Total base cost of the component is estimated at Y32.4 million (US$6.1 million equivalent), or about 4% of total base cost. Foreign exchange cost of the component would be about US$1.2 million or 20%.

Civil Work Constructions

2. A total of about 20,000 square meters of office space would be constructed at the provincial and county levels. About 4,600 square meters (23%) would be constructed during the first year of project implementation. Construction would follow the "Guideline and Standards for Construction of Administrative Offices" issued by the State Planning Commission. Average construction cost per square meter ranges from RMB Y400 to Y600, depending on location (generally more expensive in northern provinces) and level (higher standards for provincial level office). The credit would finance materials procured through ICB, but would not finance civil works. Building designs would be subject to IDA review if credit financing is involved. (Base cost Y6.0 million)

3. A total of about 22,500 square meters of dormitory space would be constructed at the provincial and county levels. About 5,300 square meters (24%) would be constructed during the first year of project implementation. Local (provincial or regional) standards for similar constructions would be followed. Average cost per square meter is expected to range between RMB Y250 to Y400. Design would also be subject to IDA review if credit is to be used. (Base cost Y6.9 million)

4. The project would also finance construction of warehouses as needed. Design is expected to vary and would be subject to IDA review if credit proceeds are to be used. (Base cost Y1.3 million)

Utility Vehicles and Office Equipment

5. As project counties are dispersed, and many of them are in remote areas, utility vehicles would be procured for project offices where justified. The project would also provide for office equipment such as micro-computers, type-writers, copying machines and fax machines for the project offices at various levels which at the moment are poorly equipped. The NPO would be responsible for making setting standards and guidelines for the provinces, which in turn would develop guidelines for project counties. Procurement of utility vehicles and office equipment estimated

to cost about Y7.9 million (US$1.5 million equivalent) would be through ICB, and final lists of items to be procured would be subject to IDA review and approval.

Project Management and Supervision

6. The NPO does not have a budget to cover costs of project management and supervision activities. It was therefore agreed that the provinces would contribute (proportional to their respective credit share) to these expenses. Activities and projected base cost totalling about Y5.0 million are summarized as follows:

a. Organization and administration costs associated with technical assistance and training activities to be carried out at the national level -- RMB Y1.0 million;

b. Project supervision, including travel and subsistence for NPO staff and managers -- RMB Y0.4 million;

c. Review of project designs by NPO staff and consultants, a total of about 20 sub-projects would be subject to NPO review -- RMB Y120,000; and

d. Operating expenses including office space, communication, transportation and stationary -- RMB Y0.5 million.

7. It is expected that the PPOs and, to a certain extent, CPOs would also use project funds to cover similar project management and supervision activities. This is estimated to amount to Y8.3 million for the six project provinces.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Outline Terms of Reference for a Study of Practices and Attitudes to Nightsoil Use in Agriculture

1. Background. Latrines in rural China are widespread but rudimentary, often consisting of little more than a shallow pit. Excreta is sometimes covered with a little soil or ashes in an attempt to control smell and flies. Elsewhere, simple pit latrines are employed which store wastes until they are removed. In more densely settled areas, public latrines have been constructed, comprising several compartments with squatting plates from which an inclined chute conveys excreta to a pit or cess-pool.

2. The collection of toilet wastes by farmers for transport to their fields and use as fertilizer/soil conditioner is a very widespread practice which may be partly or largely responsible for many of the water-related diseases prevalent throughout China. Diarrheal diseases, typhoid and hepatitis are common and a high percentage of children carry intestinal parasites (worms).

3. The Government of China, with assistance from an IDA credit, is preparing the Rural Water Supply and Sanitation project which will provide water and sanitation improvements as well as health education in 6 provinces, giving emphasis to poor and remote communities.

4. Answers are needed to a number of questions in order to establish future sanitation strategies: What is the current distribution and range of practices for nightsoil use in agriculture? What are the health consequences of current practices? How can these practices be improved? What types of latrines will be most effective and most acceptable? Will dry composted latrine wastes (from leaching type latrines) be preferable to liquid wastes (from conservancy type latrines)? Will water-flushed latrines be demanded as living standards and water consumption rise? Are leaching latrines socially and environmentally acceptable?

5. In order to maximize the effectiveness of RWSS interventions and to guide future policy for rural sanitation improvements, it is proposed to study the practices of excreta use, the probable impact of these practices on community health, and the attitudes of farmers and their families to alternative sanitation and reuse practices.

6. Objectives. The objectives of the study are:

a) to identify current practices for nightsoil use in project provinces;

b) to propose standards for treatment of domestic human wastes prior to agricultural use; and

c) to investigate attitudes towards nightsoil treatment and use as the basis for future sanitation strategies.

7. Scope of Work. The following activities are proposed:

a) review literature on the use of excreta as fertilizer and the health risks such practices entail;

b) establish regional practices through interviews and a questionnaire survey;

c) collect and analyze available health statistics and epidemiological date on nightsoil use;

d) investigate the effectiveness of preferred latrine designs in removing helminth eggs and faecal coliform. Propose a standard for household latrines;

e) identify principal economic, cultural and social constraints to changing re-use practices with a view to making then more hygienic; and

f) propose guidelines/standards for future nightsoil use in agriculture.

8. Staffing

a) Expatriate staff

Health specialist	5 months part time
Sanitation specialist	5 months part time
Social scientist	3 months part time

b) China staff

Principal investigator	18 months full time
Administrator	18 months full time
Behavioral scientist	18 months 1/3 time
3 Provincial epidemiologists	18 months 1/3 time
6 County epidemiologists	18 months full time
30 Field workers	6 months full time
6 Laboratory technicians	4 months full time
1 Data manager/supervisor	12 months full time
3 Data entry clerks	12 months full time

9. Budget

Expatriate staff	- Professional	Grant Financed
	- Travel & subsistence	$ 68,000
China Staff[1]	- Professional	Locally Financed
	- Technical	Locally Financed
	- Travel and Subsistence	$ 120,000
Equipment	- Centrifuge, etc for 4 provinces	$ 48,000
Fellowship	- 1 month for Principal Investigator	$ 6,000
Contingencies		$ 58,000
	TOTAL	$ 300,000

10. Organization & Responsibilities. The study is proposed to be carried out by provincial and county Anti-Epidemic Stations in the provinces of Hunan, Yunnan, Guangxi and Gansu. The London School of Hygiene and Tropical Medicine (or any other selected consultant) would provide specialist advice and support during the study. The study would be directed jointly by a responsible Chinese agency, the consultant and the Bank.

11. Timing and Reporting. The study will require 18 months to carry out. The following substantive reports are proposed in addition to quarterly progress reports:

a) A report on current practices giving details of practices in each region, health profiles, and proposing key questions requiring quantitative answers;

b) A report on the results and analysis of data from questionnaire surveys;

c) A report on latrine designs and their effectiveness;

d) A report on social, economic and cultural constraints to modified re-use practices;

e) A final report.

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[1] To be provided by local institutions totalling 180 months of professional input and 240 months of technical input.

CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
Summary Account by Project Component
RMB

	GUANGXI	YUNNAN	HUNAN	GANSU	NEIMONG	XINJIANG	NATIONAL	Total	Physical Contingencies %	Physical Contingencies Amount	Price Contingencies %	Price Contingencies Amount
I. INVESTMENT COSTS												
A. WATER SUPPLY	135.5	110.6	144.8	92.8	75.7	82.7	0.0	642.0	10.0	64.2	31.7	203.4
B. SANITATION	6.5	5.2	8.1	4.8	3.4	3.2	0.0	31.3	10.0	3.1	33.4	10.5
C. HEALTH EDUCATION	6.3	5.2	9.6	5.1	3.4	2.9	0.0	32.5	10.0	3.2	30.1	9.8
D. TA AND TRAINING	4.9	6.9	10.1	2.1	3.5	4.7	3.0	35.2	10.0	3.5	30.8	10.8
E. INSTIT.& MANAGEMENT	5.9	5.7	4.1	2.8	7.4	4.5	2.0	32.4	10.0	3.2	29.1	9.4
Total BASELINE COSTS	159.1	133.7	176.8	107.6	93.4	97.9	5.0	773.4	10.0	77.3	31.5	243.9
Physical Contingencies	15.9	13.4	17.7	10.8	9.3	9.8	0.5	77.3				
Price Contingencies	51.9	40.8	55.9	33.8	29.8	30.2	1.6	243.9	9.1	22.2		
Total PROJECT COSTS	226.9	187.9	250.3	152.2	132.5	137.8	7.1	1094.6	9.1	99.5	22.3	243.9
Taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Foreign Exchange	87.1	78.1	123.2	75.0	53.2	72.8	2.1	491.5	9.1	44.7		

Values Scaled by 1000000.0 11/13/1991 14:41

CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
RMB

Summary Accounts by Year

	Base Costs						Foreign Exchange	
	92/93	93/94	94/95	95/96	96/97	Total	%	Amount
I. INVESTMENT COSTS								
A. WATER SUPPLY	160.8	139.5	176.2	109.8	55.8	642.0	50.3	322.7
B. SANITATION	4.8	8.5	8.1	6.3	3.7	31.3	0.0	0.0
C. HEALTH EDUCATION	11.3	7.6	5.8	4.4	3.3	32.5	29.9	9.7
D. TA AND TRAINING	8.9	11.1	7.0	5.2	3.0	35.2	23.7	8.4
E. INSTIT.& MANAGEMENT	13.0	7.8	4.9	3.7	3.1	32.4	20.4	6.6
Total BASELINE COSTS	198.8	174.5	202.0	129.3	68.8	773.4	44.9	347.3
Physical Contingencies	19.9	17.4	20.2	12.9	6.9	77.3	44.9	34.7
Price Contingencies	39.6	47.7	69.2	53.6	33.8	243.9	44.9	109.4
Total PROJECT COSTS	258.3	239.7	291.4	195.8	109.5	1094.6	44.9	491.5
Taxes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Exchange	116.1	106.5	133.1	87.8	48.0	491.5	100.0	491.5

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CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
Summary Accounts by Year

	Totals Including Contingencies RMB						Totals Including Contingencies US$					
	92/93	93/94	94/95	95/96	96/97	Total	92/93	93/94	94/95	95/96	96/97	Total
I. INVESTMENT COSTS												
A. WATER SUPPLY	208.9	191.6	254.2	166.2	88.7	909.6	37.6	33.4	43.5	27.9	14.6	157.0
B. SANITATION	6.2	11.7	11.6	9.5	5.9	44.9	1.1	2.0	2.0	1.6	1.0	7.7
C. HEALTH EDUCATION	14.7	10.4	8.4	6.7	5.2	45.5	2.6	1.8	1.4	1.1	0.9	7.9
D. TA AND TRAINING	11.6	15.2	10.1	7.8	4.8	49.6	2.1	2.7	1.7	1.3	0.8	8.6
E. INSTIT.& MANAGEMENT	16.9	10.7	7.0	5.6	4.9	45.1	3.0	1.9	1.2	0.9	0.8	7.9
Total PROJECT COSTS	258.3	239.7	291.4	195.8	109.5	1094.6	46.5	41.8	49.9	32.9	18.0	189.1

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ANNEX 10

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Financing Plans and Credit Repayment Responsibilities

Financing Plan by Province

	Guangxi		Yunnan		Hunan		Gansu		Neimong		Xinjiang		Total	
	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%
IDA	21.0	54	18.0	55	27.0	62	18.0	68	10.0	44	16.0	66	110.0	58
Provinces and Prefectures	3.9	10	2.5	8	4.3	10	6.4	24	2.2	10	3.7	15	23.0	12
Counties and Townships	3.9	10	6.3	19	1.9	4	1.6	6	2.4	11	2.7	11	18.9	10
Communities and Individuals	10.3	26	6.1	18	10.3	24	0.5	2	8.2	36	1.7	7	37.2	20
Total	39.1	100	32.9	100	43.5	100	26.5	100	22.9	100	24.1	100	189.1	100

Financing Plan by Component

	Water Supply		Sanitation		Health Educ.		TA & Train'g		IE & Mgmt		Total	
	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%
IDA – Foreign Exchange	79.0	50	0.0	0	2.4	30	2.0	24	1.6	20	85.0	45
IDA – Local Currency	25.0	16	0.0	0	0.0	0	0.0	0	0.0	0	25.0	13
Counterpart Funds	53.0	34	7.7	100	5.5	70	6.6	76	6.3	80	79.1	42
Total	157.0	100	7.7	100	7.9	100	8.6	100	7.9	100	189.1	100

Credit Repayment Responsibilities

	Guangxi		Yunnan		Hunan		Gansu		Neimong		Xinjiang		Total	
	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%	US$ m	%
Provincial Government	0.0	0	0.0	0	0.0	0	5.4	30	0.0	0	4.8	30	10.2	9
County Government	0.0	0	0.0	0	2.7	10	0.0	0	0.0	0	0.0	0	2.7	2
Recovered from Water Charge	21.0	100	18.0	100	24.3	90	12.6	70	10.0	100	11.2	70	97.1	88
Total	21.0	100	18.0	100	27.0	100	18.0	100	10.0	100	16.0	100	110.0	100

Note: Figures may not total exactly due to rounding

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

UNDP/World Bank CPR/091/141 Project Description

Background

1. The United Nations Development Programme (UNDP), in cooperation with the World Bank, has provided technical assistance to the water and sanitation sector in China since 1983. Low-cost and appropriate water and sanitation technologies were introduced. Following the initial laboratory and field testing of different domestic and imported handpump designs, demonstration handpumps were installed between 1986 to 1987 in Langfang (Hebei Province) and in Ejinhoro (Inner Mongolia Autonomous Region). To demonstrate proper planning and implementation of a community water supply and low-cost sanitation program, CPR/88/011: the Low-Cost Rural Water Supply and Sanitation Project was initiated in 1988 in the autonomous regions of Xinjiang and Inner Mongolia. Demonstration projects and human resources development programs were administered, safe and adequate water was provided, health and hygiene condition enhanced, and technical and managerial skills of the counterparts improved satisfactorily. This project was completed in 1990.

2. To replicate the successful technological development and demonstration projects, and as a direct support to the China Rural Water Supply and Sanitation Project, CPR/091/141: the Capacity Building and Investment Preparation for Rural Water and Sanitation in Poor and Remote Areas Project was conceived and slated for implementation chiefly in Guangxi, Yunnan, Hunan, Gansu, Neimong and Xinjiang.

Goal and Objectives

3. The Project's goal is to strengthen the sector's technical, institutional and managerial capacity to plan, develop strategies, and implement and sustain rural water supply and sanitation improvements for poor and remote communities.

4. The objectives of the Project are: (a) to assist national, provincial (regional) and county agencies to develop their institutional and technical capacity to prepare sub-projects of the IDA-assisted Rural Water Supply and Sanitation Project; and (b) to assist the Executive Office of the National Patriotic Health Campaign Committee (NPHCCO) and the provincial (regional) agencies to formulate and implement strategies, enhance further development of low-cost and appropriate projects and administrate complementary support activities like hygiene education and community management.

Project Components

5. The Project has five components, viz: sector planning, strategy formulation, demonstration, human resources development, and monitoring and evaluation.

Project Cost

6. The total project cost is US$3,681,000, of which US$1,186,000 will be financed by UNDP and about US$2,495,000 (RMB Y13 million) will be borne by the Government of China. The project is expected to provide about 18 months of foreign consultant input to be implemented in conjunction with the proposed RWSS Project.

Expected Benefits

7. The target beneficiaries of the Project are: (a) the communities (individual households, users groups, schools) to be served with improved water supply and sanitation through the demonstration projects; and (b) the concerned national, provincial, prefectural and county authorities and staff.

8. Upon the termination of the Project, the following benefits will have been derived: (a) As part of "investment preparation", national and local authorities will have enhanced their skills to prepare, monitor, and evaluate sub-projects including the selection, design and implementation of sub-projects; (b) Implementation strategies and policies will have been developed and adopted at the provincial level; (c) As an element of capacity building, a total of 200 wells will have been drilled and equipped with handpumps and 160 latrines constructed in the demonstration areas, thereby improved water supplies (in terms of quantity, quality, reliability and ease of access) and sanitation condition will have been attained; (d) Illness (hepatitis, gastro-intestinal) as well as unproductive time spent in carrying water from far distance will have been reduced greatly; (e) Capacity to build and operate medium-size drilling rigs as well as the manufacture of handpumps in other provinces will have been strengthened; and (f) the persons responsible for planning, design, construction and management of water supply and sanitation facilities will have received additional valuable knowledge and experience through on-the-job ("hands-on") training and formal seminars, workshops and study tours.

9. It is expected that through this Project, the knowledge and experience gained will be disseminated to other provinces in the country. The programmatic approach, technologies and institutional models developed will help other provinces to improve their rural water supply and sanitation delivery systems. The Project, is, thus, expected to play a catalytic role in the overall development of the sector.

Institutional Arrangements

10. The executing agency is the China International Center for Economic and Technical Exchanges (CICETE) while the implementing agency is the NPHCCO. The World Bank, through the UNDP/World Bank Water and Sanitation Program (Program) of INUWS, serves as a cooperating agency.

11. The NPHCCO in association with the Program shall provide technical assistance on project planning and construction as well as system management to the concerned Provincial and County Project Offices.

Implementation Schedule

12. The Project was approved in August 1991 and became effective in October 1991. It would have an implementation period of about two years.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Organization and Functions of Project Offices

Delineation of Responsibilities

1. National Project Office - Responsible for the overall project planning, direction, coordination, monitoring, control and evaluation. Liaise with the Bank, concerned government institutions and related agencies. Procure through ICB pertinent goods and equipment as well as handle their distribution and control. Approve, as authorized, sub-project design reports and contracts. Conduct central-level initiated training programs. Provide technical assistance to the project offices. Prepare periodic project progress reports and financial statements for submission to concerned government institutions and to the Bank.

2. Provincial Project Offices - Responsible for the day-to-day provincial level project activities. Handle construction management (contracting, materials management, construction supervision and control, reporting) within the limit of its authority. Administer training programs. Procure through LCB relevant materials and equipment. Ensure compliance to financial commitments (contributions and repayments) to the project. Approve, as authorized, sub-project design reports and contracts. Review and coordinates county progress reports and financial statements and prepare provincial report for submission to concerned government institutions and to the Bank.

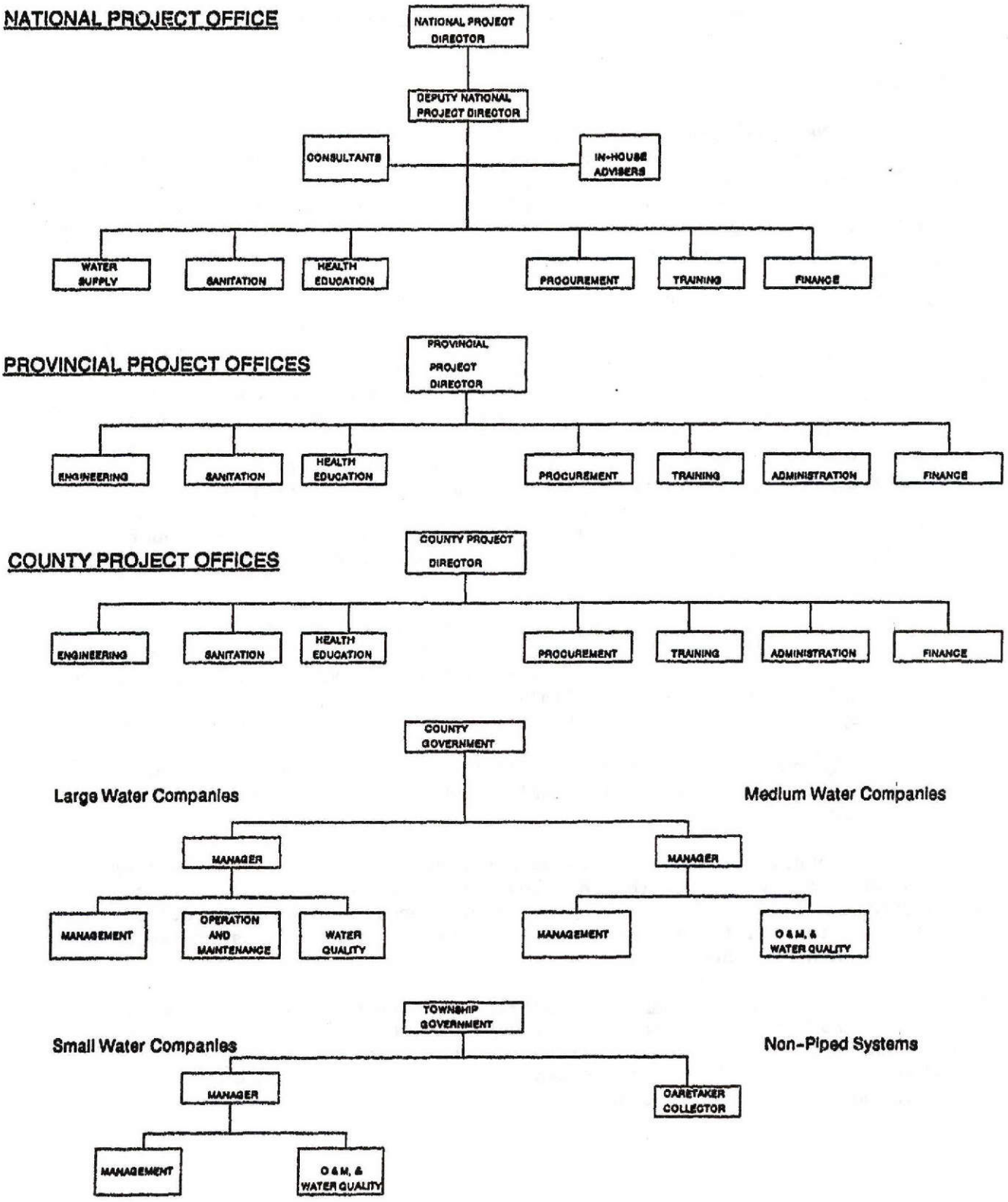
3. County Project Offices - Responsibilities are similar to the PPOs but limited to county-level operations. In addition, CPOs are responsible for the initial operation of the water companies including training of their staff (technical and financial). Liaise with the township government, specifically with the caretakers of the wells and other non-piped systems.

4. Leading Groups - were established in the national, provincial and county levels to act as the policy-making and coordinating (external) bodies of the project.

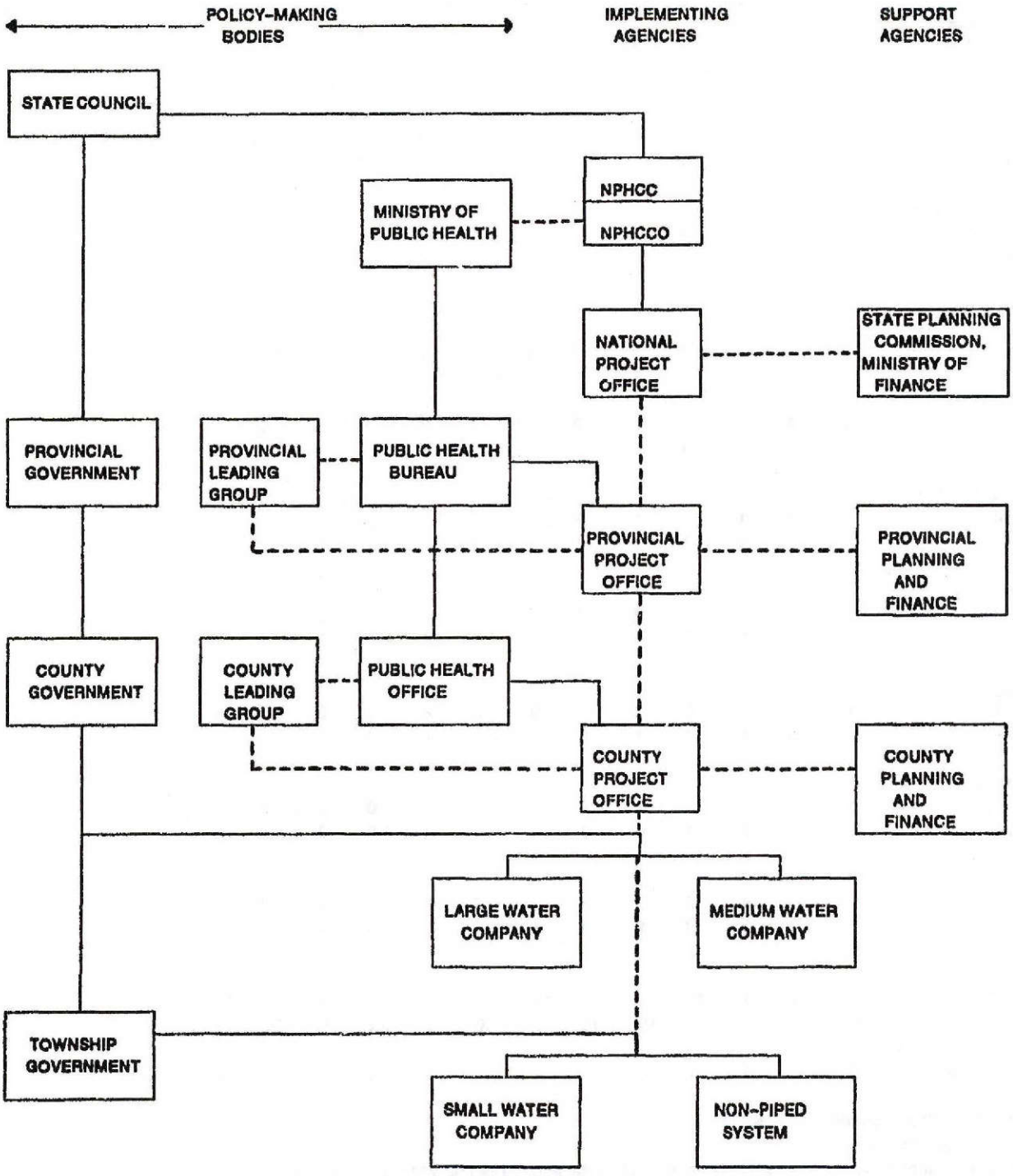
5. Support Agencies - provide necessary assistance to the project offices in terms of finance (MOF and local finance bureaus), planning and administration (SPC and local planning commissions), design institutions, health education institutes, construction bureaus, training institutions (TTC and local training centers).

6. Local Governments (provincial, prefectural, county and township) - are the backbone of the entire project development process including the operational stage in terms of provision of regulations, leadership, collaboration, etc. The concerned provincial and county Vice Governors act as the Chairman of the Leading Groups.

Project Organization Chart



Sector Organization Chart



ANNEX 13

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RURAL WATER SUPPLY AND SANITATION PROJECT

Staffing of Project Offices

		Guangxi		Yunnan		Hunan		Gansu		Neimong		Xinjiang	
	NPO	PPO	CPO	PPO	CPO	PPO	CPO	PPO	CPO	PPO	CPO	PPO	CPO
Project Management													
Required	2	3	2	2	2	2	2	3	2	2	2	5	2
Actual	2	1	2	1	2	2	2	2	2	1	2	4	1
Engineering													
Required	2	3	4	2	4	2	3	3	4	1	3	3	4
Actual	2	2	3	2	3	2	2	1	3	1	2	3	1
Health Education													
Required	1	1	1	2	1	1	1	2	1	1	1	2	1
Actual	1	1	1	1	1	1	1	1	1	1	1	2	1
Hydrogeology													
Required	0	1	1	1	1	1	1	1	1	1	1	3	1
Actual	0	1	1	1	1	1	1	1	1	1	1	3	1
Sanitation													
Required	1	2	2	1	2	2	2	1	2	1	2	2	1
Actual	1	1	1	1	1	1	1	1	1	1	1	2	1
Training Coordination													
Required	1	2	1	1	1	1	1	2	1	1	1	2	1
Actual	1	1	1	1	1	1	1	1	1	1	1	2	1
Accounting & Finance													
Required	2	3	3	2	3	2	3	2	3	3	3	2	2
Actual	1	2	2	2	2	1	2	1	2	2	2	2	1
Procurement													
Required	1	2	3	2	2	1	2	2	2	2	2	4	2
Actual	1	0	1	1	1	1	1	1	1	1	2	2	1
Translation													
Required	1	1	0	1	1	2	0	1	1	0	0	2	0
Actual	0	1	0	1	0	1	0	1	0	0	0	1	0
Other													
Required	1	5	4	2	3	2	2	2	4	3	4	3	1
Actual	1	2	3	0	1	1	1	0	3	3	3	1	1
Total													
Required	12	23	21	16	20	16	17	19	21	15	19	28	15
Actual	10	12	15	11	13	12	12	10	15	12	15	22	9
Of Which Part-Time	3	3	5	1	-	-	-	1	-	3	-	-	-

Required = Number required for project implementation.
Actual = Number on board at appraisal.
It is expected that all project offices will be fully staffed by the end of the first year of implementation.

ANNEX 14

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CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Project Implementation Schedule

YEAR	1991	1992	1993	1994	1995	1996	1997
	QTR	QTR	QTR	QTR	QTR	QTR	QTR
ACTIVITY	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Credit Processing		A E X					Y Z
Annual Plans		I R	I R	I R	I R	I R	
Procurement							
ICB Goods and Equipment		T B C	T	B C	T B	C	
LCB Goods	T	B C	B	C B	C B	C B	C
Water Supply and Sanitation Manuals	M	D	N D				
Water Supply							
Shallow-well Handpump		H H					
Warehouse Construction		K K K K	K K				
Sanitation							
Design		L L L	L N D				
Construction		V V V	V V S S	S S S S	S S S S	S S S S	S S
Nightsoil Use Study		n n	n n n n				
Health Education							
Materials Development	J	J J J J	J	J	J	J	
Training Centers		K K K K	K K K K				
TA & Training	U U	U U W W	W W W W	W W W W	W W W W	W W W W	W W
Technical Assistance	a a	a a a a	a	a	a		
Training Materials	J	J J J J	J J	J	J	J	
Training of Trainers	O	O O P P	P P				
Specialized Training	t	t t t t	t t t t	t t t Q	Q	Q	
Institutional Establishment							
Construction		K K K	K K K K	K			
Progress Evaluation				G			G

LEGEND

A Board approval of credit
a Technical assistance
B Bid invitation and evaluation
C Contract award
D Printing and distribution of updated water supply and sanitation manuals
E Credit effectiveness
G Progress evaluation at mid-term and completion
H Development of shallow-well design
I Preparation of implementation programs for the following year
J Development of training and health education materials, annual review and update
K Construction of offices and dormitories, warehouses at provincial and county levels
L Monitoring of performance of various latrine designs included in manual
M Final draft of water supply and sanitation manuals
N Preparation of new sanitation manual based on first year experience
n Study of practices and attitudes to nightsoil use in agriculture
O Training of national trainers (NPO, national consultants, institutes at the center)
P Training of provincial and county trainers
Q Training effectiveness evaluation
R Review and approval of annual programs by PPO, NPO & IDA
S Construction of sanitation facilities included in revised sanitation manual
T Preparation of tender documents
t Specialized training
U Use of UNDP CPR/91 funds to finance foreign costs of technical assistance and training
V Construction of various sanitation facilities included in first sanitation manual
W Use of RWSS credit funds to finance foreign costs of technical assistance and training
X Establishment of provincial special accounts
Y Project completion date June 30, 1997
Z Project closing date December 31, 1997

ANNEX 15

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Estimated Credit Disbursement Schedule

Fiscal Year	Semester Ending	Disbursement (US$ million)		Disbursement Profile (%)	
		Semester	Cumulative	China	Project
1992	06/30/92 a/	7	7	0	6
1993	12/31/92	9	16	7	15
	06/30/93	10	26	16	24
1994	12/31/93	10	36	31	33
	06/30/94	15	51	48	46
1995	12/31/94	15	66	61	60
	06/30/95	10	76	69	69
1996	12/31/95	10	86	76	78
	06/30/96	8	94	83	85
1997	12/31/96	8	102	89	93
	06/30/97	5	107	94	97
1998	12/31/97	3	110	100	100

a/ Includes the initial disbursement of US$7.0 million for the Special Accounts

ANNEX 16
Page 1 of 2

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Monitoring Indicators

1. Sub-project under preparation, under construction and completed:

   - Point out the estimated number of sub-project per development stage and the total number of sub-projects to be constructed;

   - Compare targets to physical accomplishments and register deviations;

   - Provide additional information such as community participation aspects, the number of sub-projects which were not yet started but actual work had begun (e.g., surveys and designs); and

   - Track down delays in execution and "start-up" problems including dates when the sub-projects are expected to be started and completed.

2. Expenditures incurred and status of disbursement:

   - Quantify total amount spent in the project per reporting period and the credit availments made;

   - Compare financial projections (e.g. cash flow) to actual expenditures and credit disbursement as well as physical accomplishments; and

   - Indicate too slow/fast disbursements, and determines cause and impact of such situation, hence, future actions can be anticipated.

3. Procurement status (ICB and LCB):

   - Enumerate the different procurement activities (e.g., pre-qualification, advertisement, bidding, bid evaluation and awards) and indicates the number of procurement lots under each activity;

   - Signify procurement schedule (e.g., milestone targets) and the extent of compliance; and

   - Reflect the names and other detailed information of suppliers and manufacturers.

4. Status of civil works contracts:

   - Present the estimated number of civil work contracts to be entered into and the number of contracts commissioned.

5. Progress of health education program:

- Denote the type and quantity of health education materials to be produced, distributed and disseminated; and

- Record the estimated and actual number of health education classes to be undertaken.

6. Progress of technical assistance:

- Show the types (or focus) of technical assistance to be provided and the implementation schedule;

- Classify the consultants or staff needed to accomplish the tasks; and

- Describe the impact of the assistance extended.

7. Progress of training programs:

- Exhibit an annual training program including training modules/courses, schedules/deviations, number of training events/sessions, participants (by gender), manpower requirements and budgets;

- Evaluate training performance and impact of the training program; and

- Quantify the number of training programs conducted and compare with plans.

8. Staffing:

- Record the planned and filled staff positions; and

- Determine adequacy or deficiency of personnel per project office.

9. Major outstanding issues and problems, proposed solutions and required actions:

- Enumerate the issues and problems being encountered, propose solutions(s) and indicate necessary actions to be taken by concerned institution and/or official;

- Track policy, operational and personnel-related issues and problems and resolve to the extent possible with built-in solutions; and

- Anticipate or prevents an issue from becoming a problem, or a minor problem from becoming a serious problem that may greatly affect the prosecution of the sub-projects.

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Supervision Plan

1. IDA Staff Supervision Input. Regular and continuous supervision by IDA staff would be needed throughout the start-up and investment phases of the project. During the first two years of project implementation, IDA staff (headquarters and RMC) would work closely with the staff of the UNDP/World Bank Beijing office in the development of training and technical assistance programs, dissemination of appropriate technologies for water supply and sanitation, and review of physical progress. Combined supervision input into key activities during the first year of project implementation is detailed in Table 1. IDA staff input is estimated to be about 12 staff-weeks. Detailed requirements for outer years would be developed along with the Annual Project Implementation Plans.

2. Implementation Agencies' Supervision Input. Overall project monitoring and coordination would be the responsibility of the National Project Office (NPO). Review meetings and workshops with project provinces would be held at least once a year to cover issues relating to procurement, disbursement, allocation and collection of counterpart funds, accounting and auditing, selection of appropriate technology, preparation and review of project design, physical construction, development of training and health/hygiene education materials, and preparation and modification of annual implementation programs.

3. Provincial and county project offices (PPOs and CPOs) would hold more frequent and less formal review meetings and workshops. They will be responsible for identifying problems and resolve them and/or seek help for their resolution in a timely manner. Significant lessons learned should also be recorded and disseminated.

Table 1: IDA Supervision Input into Key Activities During First Year of Project Implementation

Approximate Date (Month/Year)	Activity	Expected Skills Requirement	Staff Input (Staff-Weeks)
4-5/92	Supervision Mission (including CPR/91/141 staff) "Project Launch Workshop" which focuses on: (a) clarifying institutional setup and staffing (b) implementation schedule, first year program (c) reporting requirements and procedures (d) procurement, first batch of ICB goods (e) disbursements, special accounts	Water Supply engineering (WE) Sanitation engineering (SE) Health/Hygiene education (HHE) Financial analysis (FA) Procurement Disbursement	6
5-8/92	Review procurement documents and bid evaluation reports for first ICB batch	Procurement	2
10-12/92	Review project implementation plan for 1993 and assist in modifications	PM, WE, SE, HHE, FA Training	2
11-12/92	Supervision Mission (a) discuss project implementation plan for 1993 (b) site visits to review physical progress (c) review training and HHE materials (d) review accounting practices and records	WE, SE/HHE, FA	4
2-3/93	Evaluation of sanitation facilities built	Sanitation engineering	1

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Provincial and County Finances

Provincial Finances

	Guangxi		Yunnan		Hunan		Gansu		Neimong		Xinjiang	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Annual Expenditure in Rural Water Supply and Sanitation Sector (1987-1989) (Y million)	11.6	7.5	25	14	41.7	24.6	13.3	9.3	7.1	1.3	35.6	9.4
Annual Sector Expenditure as % of Total Expenditure	0.2	0.1	0.3	0.2	0.5	0.4	0.3	0.3	0.1	-	0.8	0.2
Estimated Annual Expenditure for Proposed Project (Y million)	5.7	-	3.7	-	5.7	-	8.8	-	2.7	-	3.2	-
Estimated Project Expenditure as % of Total Expenditure	0.07	-	0.04	-	0.06	-	0.19	-	0.05	-	0.06	-

County Finances

	Guangxi		Yunnan		Hunan		Gansu		Neimong		Xinjiang	
	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
Annual Rural Water Supply and Sanitation Sector Expenditure as % of Total Expenditure (1987-1989)	0.9	-	2.3	0.1	0.3	-	6.6	-	1.7	0.1	4.3	-
Estimated Annual Project Expenditure as % of Total Expenditure	2.6	-	3.1	-	0.9	-	0.9	-	1.5	-	0.3	-

CHINA

ANNEX 19
Page 1 of 2

RURAL WATER SUPPLY AND SANITATION PROJECT

Typical Costs and Affordability

Province/County	Consumption (lpcd) High	Consumption (lpcd) Low	Water Charge (fen/ton) High	Water Charge (fen/ton) Low	Average Charge (Y/person/year) High	Average Charge (Y/person/year) Low	1989 Average Per Capita Income (RMB Y)	Projected Water Charges as % of 1989 Income High	No. of Counties
1. Guangxi									
Fusui	60	20	50	25	7.30	2.92	355	1.6	
Longan	60	40	66	40	11.91	5.96	353	3.4	
Laibin	65	40	45	25	8.30	5.96	280	3.0	
Pingguo	60	20	77	38	9.86	5.55	245	4.0	
Qinzhou	60	40	80	53	11.91	5.96	507	2.4	
Yangshuo	80	40	45	14	8.78	2.92	388	2.3	
Cenxi	60	20	48	40	9.86	3.26	410	2.4	
Guigang	60	45	72	45	12.36	9.23	332	3.7	
Duan	60	20	57	45	10.95	3.65	236	4.6	
Provincial	80	20	80	14	12.36	2.92	483	3% and under	5
								3-5%	4
								Over 5%	0
2. Yunnan									
Qujing	65	40	77	47	11.24	7.21	431	2.6	
Qiaojia	40	30	32	19	5.04	2.05	162	3.1	
Baoshan	50	25	50	45	9.15	6.34	355	2.6	
Yunxian	40	30	65	28	9.49	4.09	225	4.2	
Mile	60	40	91	30	19.60	6.57	343	5.7	
Weishan	55	20	85	19	10.50	3.40	228	4.6	
Chuxiong	60	20	56	37	11.25	8.04	364	3.1	
Provincial	65	20	91	19	19.6	2.05	460	3% and under	2
								3-5%	4
								Over 5%	1
3. Hunan									
Chaling	80	35	72	22	11.83	3.83	476	2.5	
Hengdong	80	30	77	20	12.65	3.29	637	2.0	
Hengshan	80	35	79	22	14.89	3.70	488	3.1	
Chengbu	80	40	65	33	12.56	5.26	427	2.9	
Yueyang	80	40	73	37	12.85	9.49	774	1.7	
Huarong	80	40	78	38	14.31	9.93	779	1.8	
Linli	80	40	73	30	12.85	5.26	526	2.4	
Anxiang	75	40	70	42	11.50	10.22	612	1.9	
Sangzhi	70	35	63	21	11.63	3.32	199	5.8	
Nanxian	75	40	67	41	11.22	9.78	603	1.9	
Xinhua	70	35	66	21	10.13	3.83	347	2.9	
Jiahe	80	35	65	22	12.59	3.83	545	2.3	
Chenxian	80	35	71	25	12.26	3.70	372	3.3	
Jianghua	80	35	66	20	12.26	3.32	312	3.9	
Jiangyong	80	35	69	21	14.02	3.70	580	2.4	
Chenxi	80	35	78	21	14.31	3.45	431	3.3	
Qianyang	75	40	66	32	10.13	5.40	594	1.7	
Yongshun	70	40	63	34	9.64	5.40	406	2.4	
Fenghuang	80	35	70	23	13.72	3.70	443	3.1	
Provincial	80	30	79	20	14.89	3.29	546	3% and under	13
								3-5%	5
								Over 5%	1

Province/County	Consumption (lpcd) High	Consumption (lpcd) Low	Water Charge (fen/ton) High	Water Charge (fen/ton) Low	Average Charge (Y/person/year) High	Average Charge (Y/person/year) Low	1989 Average Per Capita Income (RMB Y)	Projected Water Charges as % of 1989 Income High	No. of Counties
4. Gansu									
Lintao	60	20	89	39	16.21	3.65	352	4.6	
Tongwei	60	20	83	37	15.77	3.72	280	5.6	
Huining	60	20	86	36	16.43	3.72	272	6.0	
Jingyuan	60	20	89	39	16.64	3.80	355	4.7	
Pingliang	60	30	95	48	16.43	6.90	444	3.7	
Zhenyuan	60	20	85	37	15.77	3.65	344	4.6	
Minle	60	20	95	41	17.52	4.16	477	3.7	
Beidao	60	20	90	36	17.30	4.02	374	4.6	
Qincheng	60	20	88	73	16.64	5.91	378	4.4	
Wuwei	60	40	93	72	16.21	12.99	470	3.5	
Linxia	60	40	84	75	16.43	12.26	266	6.2	
Xiahe	60	40	89	76	16.86	12.56	449	3.8	
Huixian	60	30	90	49	16.43	6.79	459	3.6	
Yongdeng	60	40	86	70	15.77	12.26	370	4.3	
Provincial	60	20	95	36	17.52	3.65	376	3% and under	0
								3-5%	11
								Over 5%	3
5. Neimong									
Tongliao	80	40	64	50	14.60	9.34	700	2.1	
Naiman	60	20	57	16	11.17	1.53	240	4.7	
Arun	80	20	65	15	14.60	1.83	593	2.5	
Linxi	60	20	62	15	10.95	1.39	365	3.0	
Dalad	60	20	63	18	11.83	1.61	463	2.6	
Ejin Horo	60	20	59	10	11.61	1.46	357	3.3	
Tumd Zuo	60	20	64	16	11.39	1.68	460	2.5	
Togt	60	20	57	17	11.17	1.46	225	5.0	
Hohhot	70	20	62	17	13.80	1.75	480	2.9	
Provincial	80	20	65	10	14.60	1.39	500	3% and under	6
								3-5%	3
								Over 5%	0
6. Xinjiang									
Moyu	60	25	72	17	10.51	2.01	305	3.5	
Hotan	60	25	81	14	11.83	2.04	413	2.9	
Shule	60	25	76	18	11.10	2.10	401	2.8	
Shache	60	25	70	15	10.22	2.17	444	2.3	
Akto	60	25	84	16	12.26	1.92	407	3.0	
Kuqa	60	25	79	10	11.53	1.46	476	2.4	
Luntai	60	25	89	12	13.14	1.75	505	2.6	
Toksun	60	25	80	15	11.68	2.17	748	1.6	
Jinghe	60	25	87	17	12.70	2.10	719	1.8	
Altay	60	25	78	10	11.39	1.46	487	2.3	
Aksu	60	40	79	38	11.53	8.32	542	2.1	
Kashgar	60	25	88	17	12.85	2.10	494	2.6	
Bole	60	25	73	17	10.66	2.28	479	2.2	
Wujiaqu	60	40	74	30	11.17	6.57	515	2.2	
Kuytun	60	40	68	37	9.93	8.10	482	2.1	
Shihezi	60	40	69	41	10.07	8.98	489	2.1	
Beitun	60	25	87	10	12.70	1.46	391	3.3	
Provincial	60	25	89	10	13.14	1.46	496	3% and under	15
								3-5%	2
								Over 5%	0

ANNEX 20

CHINA

RURAL WATER SUPPLY AND SANITATION PROJECT

Selected Documents and Data Available in Project File

1. Draft National Project Proposal.

2. Draft Provincial Project Proposals by Guangxi, Yunnan, Hunan, Gansu, Neimong and Xinjiang.

3. Draft County Project Proposals and typical design reports and drawings of water supply and sanitation facilities by:

   Longan, Laibin and Qinzhou of Guangxi;
   Qujing, Qiaojia and Mile of Yunnan;
   Hengdong, Anxiang and Qianyang of Hunan;
   Lintao, Minle and Qincheng of Gansu;
   Tongliao, Tumb Zuo and Hohhot of Neimong; and
   Shache, Altay and Shihezi of Xinjiang.

4. Consultant Team's Report, December 1990.

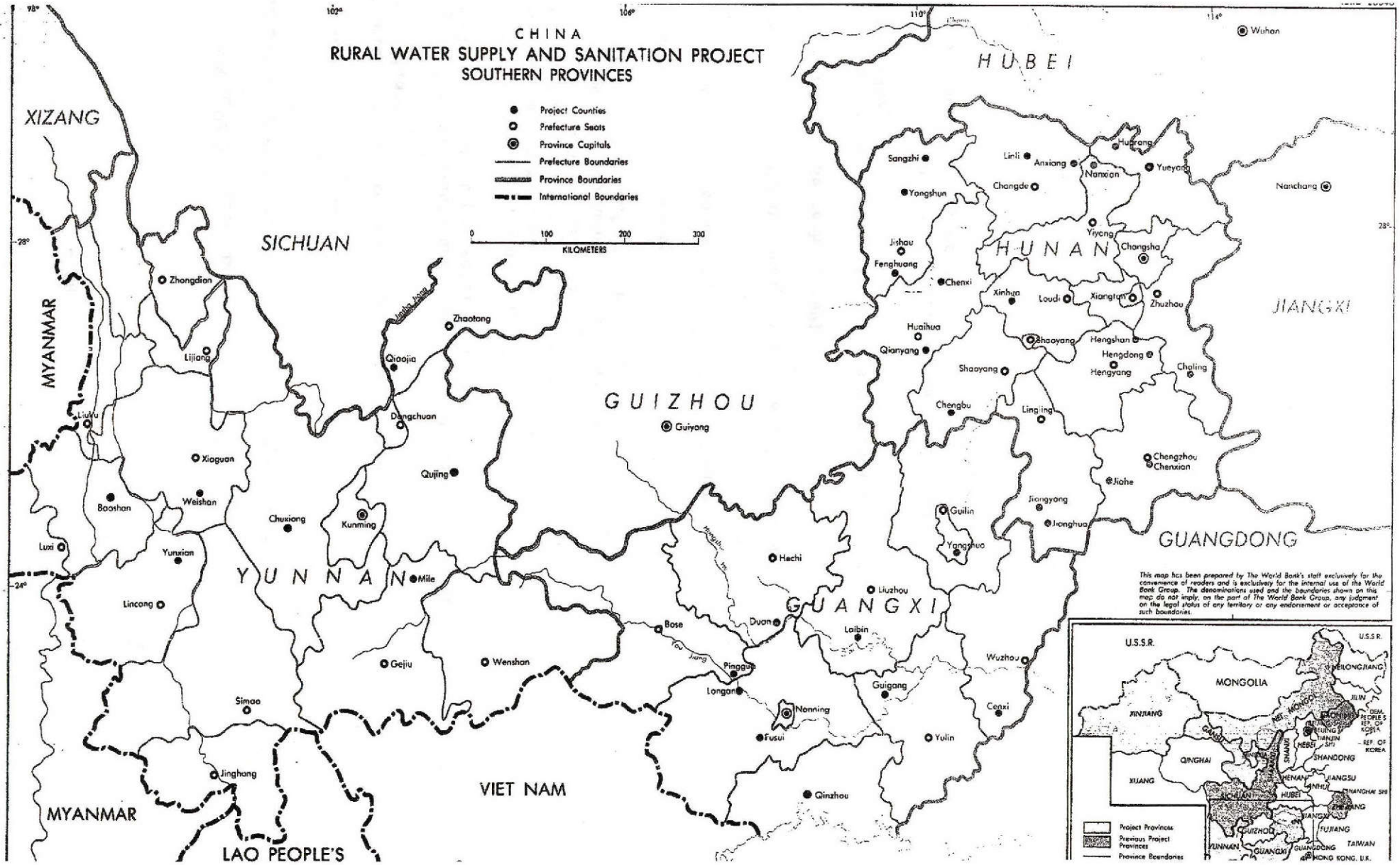
5. Consultant's review report on existing rural water supply manuals, July, 1990.

6. Draft Supplemental Rural Water Supply Design Manual, September, 1991.

7. Draft Sanitation Manual, September, 1991.

8. Simplified provincial and county financial statements (historical and projected, 1987-1992).

9. Typical costs and required tariff levels of various water supply technologies, by county and by province.


CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
SOUTHERN PROVINCES
Project Counties
Prefecture Seats
Province Capitals
Prefecture Boundaries
Province Boundaries
International Boundaries
0 100 200 300
KILOMETERS
XIZANG
SICHUAN
HUBEI
HUNAN
JIANGXI
GUIZHOU
YUNNAN
GUANGXI
GUANGDONG
MYANMAR
LAO PEOPLE'S
VIET NAM
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Baoshan
Luxi
Yunxian
Lincong
Xiaguan
Weishan
Chuxiong
Mile
Qujing
Dongchuan
Qiaojia
Zhaotong
Jinsha Jiang
Gejiu
Wenshan
Simao
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TIANJIN SHI
HEBEI
SHANXI
SHANDONG
QINGHAI
HENAN
JIANGSU
XIJANG
SICHUAN
HUBEI
ANHUI
SHANGHAI SHI
ZHEJIANG
GUIZHOU
FUJIANG
TAIWAN
YUNNAN
GUANGXI
GUANGDONG
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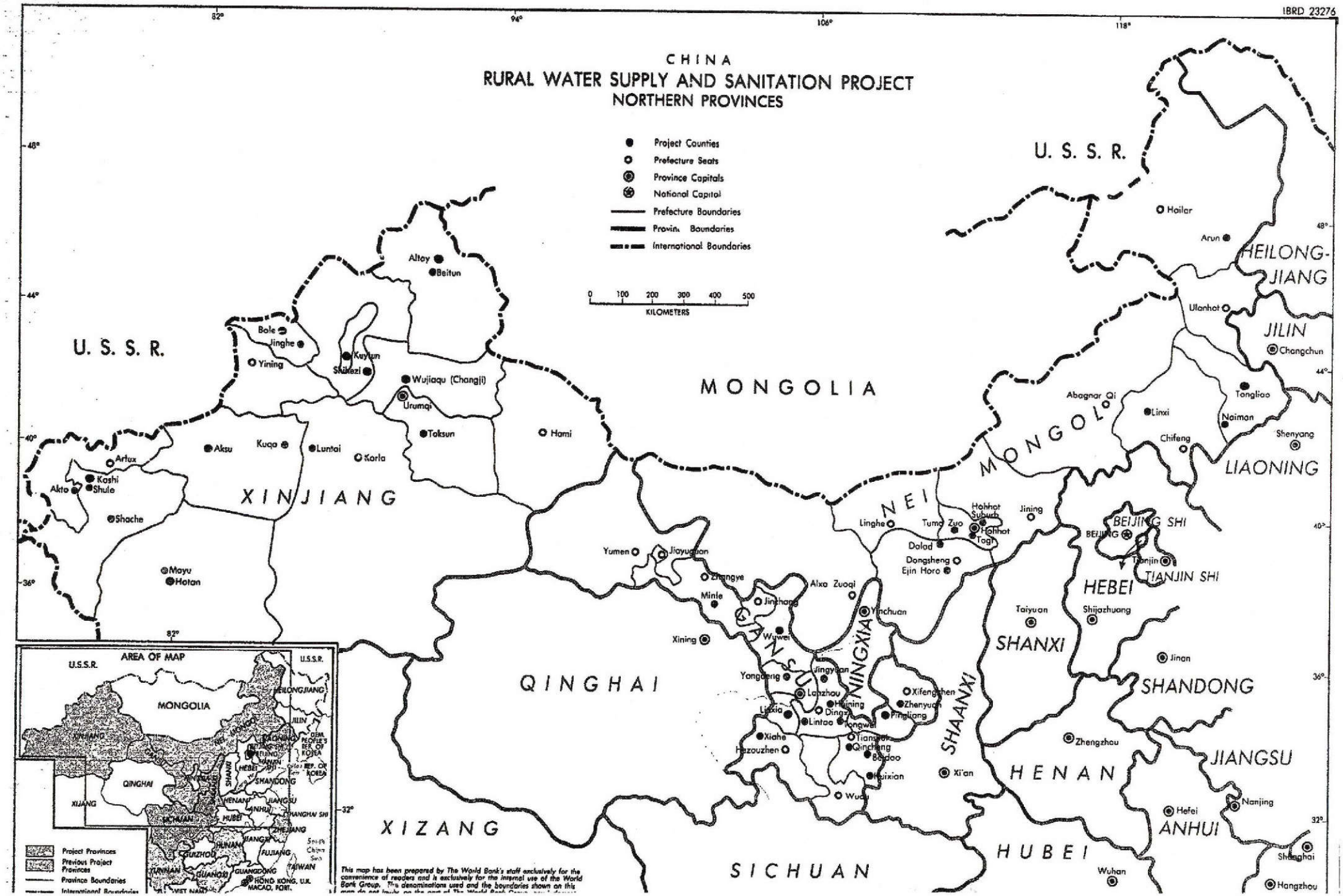
Project Provinces
Previous Project Provinces
Province Boundaries

IBRD 23276

CHINA
RURAL WATER SUPPLY AND SANITATION PROJECT
NORTHERN PROVINCES



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ROUTING SLIP	DATE: July 19, 1999

NAME	ROOM. NO.
Mr. Hernan Levy, Audit Review Panel	G7033

	URGENT		PER YOUR REQUEST
	FOR COMMENT		PER OUR CONVERSATION
	FOR ACTION		NOTE AND FILE
	FOR APPROVAL/CLEARANCE		FOR INFORMATION
	FOR SIGNATURE		PREPARE REPLY
	NOTE AND CIRCULATE		NOTE AND RETURN

RE: CHINA: Rural Water supply and Sanitation Project (Credit 2336-CHA)
Implementation Completion Report

REMARKS:

Please find attached for panel review the above-mentioned ICR together with the Project Information Form, and a draft Evaluation Summary from the Manager, OEDST, to the Country Director concerned.

FROM	ROOM NO.	EXTENSION
Klas Ringskog, Task Manager	**G7011**	**37595**