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Rural Water Supply And Sanitation In China— Scaling Up Services For The Poor

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Executive Summary

Nearly three-quarters of China's population—947 million people (including about 120 million in towns)—lives in rural areas. Historically, rural residents have obtained water from rain, rivers, streams, lakes, ponds, and shallow wells, in some cases having to walk several kilometers to fetch it. Moreover, rural residents often rely on unhygienic open pit latrines for sanitation. As a result, intestinal and endemic diseases are rampant in many poor villages. By 2002, 868 million rural residents—92 percent of the total—had access to improved water supplies. Of these, 57 percent had access to piped water systems, a 43 percent increase over 1985. In addition, 49 percent of rural households had sanitary latrines, 41 percent more than in 1993.

Increasing rural access to safe, conveniently located water and sanitary latrines is a high priority for the Chinese government. Such investments are essential for continued poverty reduction in rural China because they dramatically improve health and living standards and promote social and economic development. The government has set ambitious targets in this regard, aiming for 95 percent of the rural population to have access to improved water supplies, 70 percent to have piped water supplies, and 65 percent to have sanitary latrines by 2010.

Domestic institutions for rural water supply and sanitation

China's campaign to improve rural water supply and sanitation began on a large scale in 1980. Because no single agency or ministry has an overall mandate for rural water supply and sanitation, activities overlap among institutions at the national, provincial, county, and village levels. However, policy directives, design specifications, and engineering standards issued by the central government guide these efforts.

In addition, the National Patriotic Health Campaign Committee is responsible for sector coordination and advocacy at the national, provincial, and county levels. At the same time, provincial and county governments oversee preparation and execution of rural water and sanitation investments. Service implementation and management have been decentralized to township governments and village committees.

The central and local governments, as well as rural residents, also welcome the participation of nongovernmental organizations (NGOs) and private entities in developing rural water supply and sanitation works. NGO projects for rural water supply are jointly organized and managed with local governments. Private investment, which began only in the past few years, occurs either independently or with local governments. Although the number of private investors is small, it is a good start—and has positive impacts on sector development.

Sources of domestic financing

Financing for rural water supplies and sanitary latrines comes from many sources, including users, village committees, and different levels of government, as well as foreign loans and grants. Users, the largest source of financing, are expected to finance a significant share of capital costs and all operation

and maintenance costs, including servicing of project loans. These costs are recovered through water tariffs, which are regulated by county price bureaus.

These financing policies, in place for many years, have been extremely effective, not least because of strong political will to enforce the cost recovery policy. For example, the capital costs of World Bank-assisted rural piped water supply projects are typically split between governments (25 percent), users/village committees (25 percent), and the Bank credit/loan (50 percent). Users service the Bank through payment of water tariffs, effectively making the users finance up to 75 percent of the capital costs. For sanitation, capital costs are divided among governments (10 percent), village committees (15 percent), users (70 percent), and others (5 percent).

The role of foreign assistance

Since 1981, aid from the Bank, United Nations Children's Fund, United Nations Development Programme, and other donors has accounted for about 5 percent of investments in rural water supply and sanitation. Although the financial contributions of these agencies are small relative to domestic investments, international assistance is important for building institutions; scaling up initiatives; ensuring their sustainability and financial viability; introducing new technology, management techniques, and approaches to operation and maintenance; and other innovations.

About 80 percent of foreign funding (\$331 million) has come from the Bank. The first Bank-supported project for improving the rural water supply started in 1985 and was followed by three others, with each building on lessons from the previous ones. The four projects involved 72,000 water supply subprojects in 178 counties across 18 provinces, reaching nearly 23 million beneficiaries. The Bank-supported sanitation projects have built 64,500 sanitary latrines. These projects have also trained a huge number of rural residents about water supply, health care, and hygiene issues. In addition to the benefits that typically accompany expanded water consumption and sanitation coverage, there is evidence that Bank projects have increased local incomes and investments.

Factors for success and lessons of experience

Government programs have dramatically increased awareness of health care and hygiene issues among rural populations. Such progress has greatly improved the lives and health of rural residents and promoted rural economic and social development.

The scaling up and achievements of rural water supply and sanitation in China are closely linked to the country's stable political situation, rapid economic growth, commitment to rural residents, strong capacity to mobilize resources (domestic and foreign), well-developed administrative and management arrangements, strong demand from local governments and rural residents, and political willingness to charge—and users' willingness to pay—cost-covering water tariffs. In addition, innovative mechanisms have been used to deliver services, including decentralized and participatory approaches; cross-sector collaboration; flexible investment and management models; and a scientific, rational approach to design, construction, management, operation, and maintenance.

China's experiences with rural water supply and sanitation offer a range of lessons, including the need for:

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- Strong, determined leadership
- Simple, clear rules to enforce accountability
- Coordination between government departments and agencies
- Community participation
- Commitment to recovering costs from users
- Capacity building
- Technical assistance from international organizations
- Sharing experience and knowledge
- Integration of sanitation and health education with rural water supply.

1. Implementation Procces

1.1 Background and Country Context

China is a large developing agricultural country. In accordance with the data from the State Statistic Bureau, its rural population was 947 millions in 2002, or 74 percent¹ of its total population. Historically, rural residents (i.e. population who have their registration in village) obtain their water directly from rainwater, rivers, streams, lakes, ponds and shallow wells, some of them have to walk for kilometers to fetch their water. Also, rural residents use unhygienic open pit latrines for defecation practices, and apply temporary stored human excreta from open pit latrines as fertilizers to enrich their farmlands. Although more evidence and research is required to confirm the degree of positive impacts of improved rural water supply and sanitation (RWS&S) on reductions in disease incidence and poverty, the incidence rates of intestinal diseases and endemic disease are very high in poor villages which do not have safe water supply, sanitation latrines and good hygiene practices. There is a need to reduce the time and cost for rural residents to obtain clean and safe water supply, which meets national standards, and to improve the health and hygiene conditions, thus to contribute to continued poverty reduction in rural China.

Since the establishment of the People Republic of China in 1949, the Communist Party of China (CPC) and the Government of China (GOC) have highly emphasized the need for continued government support in development of improved rural water supply and sanitation. For more than two decades of implementing its reform and open policy of the country, improved rural waste supply and sanitary latrine development works have been strategic importance for poverty reduction program in rural China.

In response to the United Nations' Declaration of "International Drinking Water Supply and Sanitation Decade" (1981 – 90), the Government of China approved the National Patriotic Health Campaign Committee (NPHCC) to act as the State Action Committee and to take a lead in planning of its Declaration, through close coordination with all relevant institutions involved in rural water supply and sanitation works. Subsequently, a national office of NPHCC was set up under the Ministry of Health (MOH) to actually carry out the responsibilities of NPHCC in scaling up services for the poor rural residents in China.

The central government set beneficiary target of improved rural water supply in its 7th Five Year Plan of Social Development and Economic Construction in 1986, and beneficial household target of sanitary latrines in its 9th Five Year Plan in 1996. Since then, rural water supply and sanitation development works have become the responsibilities and targets that central and local governments have to set and achieve in each Five Year Plan. **Table 1** depicts the targets and achievements of improved rural water supply and sanitation in the 7th to 10th Five Year Plans of Social Development and Economic Construction, and the MDG target.

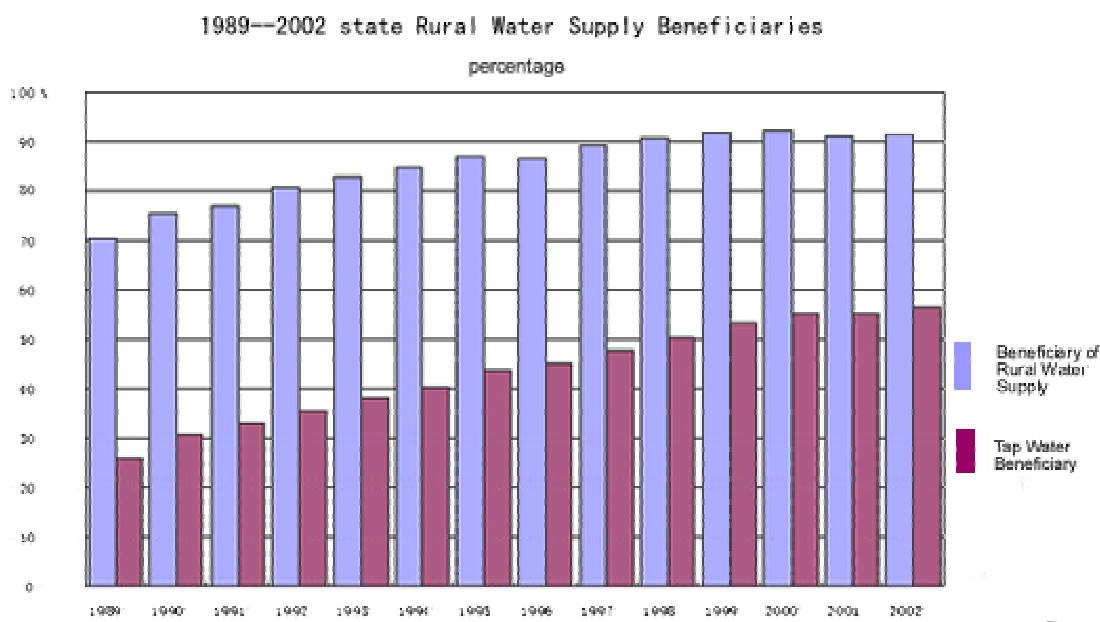
¹ This includes population in designated towns in the order of 120 million or 10 percent of China's total population, corresponding to towns of a population ranging from a few thousand to close to 200,000. The rural population, excluding towns, according to the census November 1, 2000 was 807 million or 64 percent of the total population. This would likely have decreased to about 61 percent at present. (Source: China Statistical Yearbook 2001)

Table 1 – Targets/Achievements of Improved Rural Water Supply and Sanitation of the 7th to 10th Five Year Plans and MDG

No	Description	7 th Five Year Plan, 1986-1990	8 th Five Year Plan, 1991-1995	9 th Five Year Plan, 1996-2000	10 th Five Year Plan, 2001-2005	MDG Target, 2010
1	Targets of Improved Water Supply Service Coverage	80 percent	85 percent	90 percent	95 percent	95 percent
2	Achievements of Improved Water Supply Service Coverage	76 percent	87 percent	92 percent	-	-
3	Achievements/Targets of Piped Water Supply Service Coverage	31 percent	44 percent	55 percent	60 percent	70 percent
4	Targets of Sanitary Latrines Coverage	-	-	40 percent	55 percent	65 percent
5	Achievements of Sanitary Latrine Coverage	-	-	49 percent	-	-

Having access to an improved water services does not mean having access to safe water. While almost all piped water systems meet the government's standards for safe water quality, the same is not true for hand pumps and other systems. **Figure 1** depicts the existing improved rural water supply coverage in China from 1989 to 2002. A survey conducted by the Sanitation Monitoring Station of the Chinese Academy of Preventive Medicine in 2000 reported that only 62 percent of the existing improved rural water supply met the national drinking water standards. The NPHCC has estimated that about 210 millions rural residents (or equivalent to 22 percent of the current rural residents) would need to be upgraded to meet the national drinking water standards. In 2002, 868 million rural residents, or about 92 percent of total rural residents, have access to improved water supply.

Figure 1 – Existing Improved Rural Water Supply Coverage (1989 – 2002)



The breakdowns of existing improved rural water supply service coverage in China in 2002 are shown in **Table 2**.

Table 2 – Breakdowns of Existing Improved Rural Water Supply Service Coverage in 2002

No	Description	Rural Population, (Million)	Coverage, percent
1	Piped Water Supply System	536.5	56.6
2	Deep Well Hand Pump System	209.2	22.1
3	Rainwater Collector System	11.9	1.3
4	Others (Spring, River, Shallow Well, Etc)	110.8	11.7
5	Sub-Total:	868.4	91.7
6	Without Water Supply System	78.8	8.3
7	Total Rural Population in 2002	947.2	100

Figure 3 shows the existing sanitary latrine coverage of China is rural population from 1996 to 2002. At present, about 49 percent of rural households in China have sanitary latrines to dispose of their human wastes.

The breakdowns of existing sanitary latrines types are shown in **Table 3**. The most commonly used sanitary latrine is three compartment septic tanks, followed by double container composting latrine, and biogas latrine.

Figure 2 – Existing Sanitary Latrine Coverage (1996 – 2002)

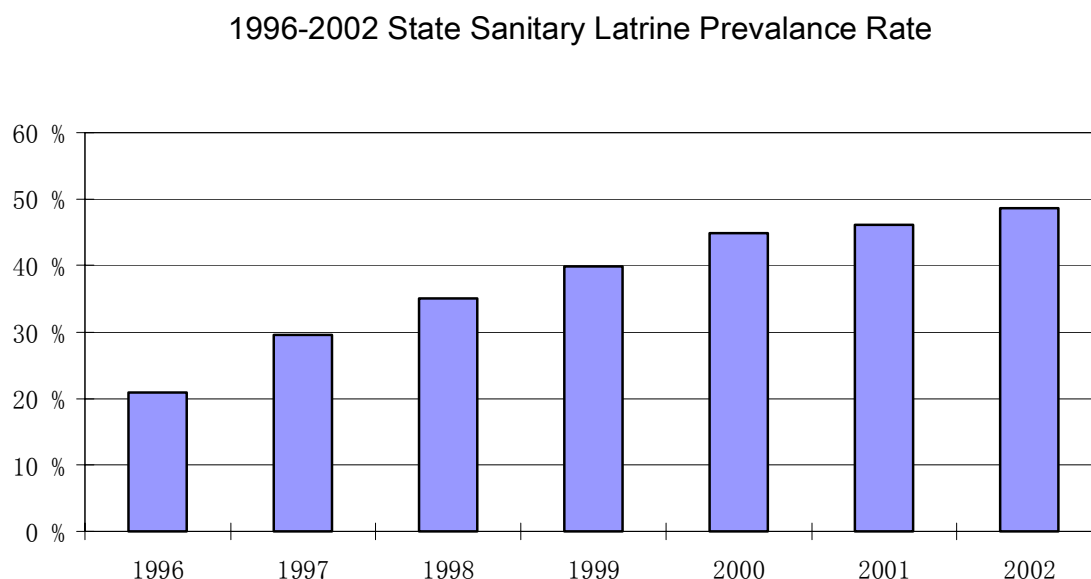


Table 3 – Breakdowns of Existing Household Sanitary Latrine Coverage in 2002

No	Description	Rural Households (Thousand)	Coverage, percent
1	Three Compartment Septic Tank Latrine	31,790	12.8
2	Double Urn Composting Latrine	11,872	4.8
3	Biogas Latrine	9,134	3.7
4	Others*	67,821	27.36
5	Sub-Total:	120,617	48.7
6	Without Latrine	127,272	51.3
7	Total Rural Households in 2002	247,889	100

Source: NPHCC Annual Report 2002.

* Others include latrines with separation of excrement and urine; latrines with sewerage systems; latrines with improved ventilation, latrines with deep pits, and latrines with double pits, etc.

1.2 Policy Framework for Scaling Up

As the economic performance and social development of the country improves, the central government has revised its policy framework for scaling up improved rural water supply and sanitation to meet the demands of the rural populations. The broad policy frameworks are depicted below:

- Central government sets the RWSS policy and plan for the whole country, and NPHCC is responsible for sector coordination and advocacy at national, provincial and local levels;

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- Provincial and county governments oversee the implementation of RWSS projects and ensure that the directives and plans laid down by the central government and NPHCC are properly implemented;
- Township government and village committee are responsible for actual RWSS project implementation;
- Significant user-financing of capital investment and full user-financing of Operations and Maintenance costs. Contributions of capital investment grants for poverty provinces from central government are subject to evaluation and approval;
- Management of water supply to be decentralized to the lowest appropriate level, typically township government or village committee;
- Local institutional and management approach to be adopted in accordance with local conditions; privatization is also allowed;
- Water quality to be the responsibility of the agency constructing the water systems, and monitored by local health bureaus;
- Water tariffs for piped water systems to be regulated by county price bureaus;
- Water is an economic good and providers of water supply are allowed to make a profit from their operations;
- NPHCC to provide technical guidance and develop technological standards;
- Sector subsidy from central or provincial government is only considered for extremely poor villages and minorities which are usually small in size and scattered;
- Investments of piped water supply systems are preferable unless there is no available water source or households are scattered. Deep well hand pumps and rainwater collectors are only promoted for the later situations;
- Standards and technical requirements recommended in “Design of Sanitary Latrine for China Rural Areas” by NPHCC are promoted; and
- Capacity building in engineering and financial issues to ensure sustainability of RWSS investments

1.3 Institutional Arrangements

National, Provincial, County, Township and Village Levels

The rural water supply and sanitation development works in China are the responsibility of NPHCC. Under the leadership of the central government, NPHCC organizes and collaboration with concerned departments at national, provincial, county and township levels for planning, implementation and management of rural water supply and sanitation works.

The NPHCC, as a coordinating committee for official resolutions, consists of senior representatives from nearly 30 ministries and commissions, such as Ministry of Health (MOH), Ministry of Construction (MOC), Ministry of Agriculture (MOA), Ministry of Water Resources (MOWR), State Environmental Protection Administration (SEPA), etc. at national level. The NPHCC was established in March 1953 with a Country Vice Premier as its Director, and Minister of Health as its Deputy Director.

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The NPHCC has similar committees and offices established at provincial and county levels, and leaders of local governments are also directors of the local PHCCs and leaders of various departments are their members. The actual work responsibilities are divided among the offices at national, provincial and county levels.

Figure 3 below depicts the flow diagram of institutional arrangements of rural water supply and sanitation works in China.

There is no single agency or ministry that has an overall mandate for RWSS in China. Overlaps of activities exist in institutions at national, provincial, county and village levels. The following depicts the institutions with their respective roles related to RWSS in China:

- National Development and Reform Commission (NDRC): responsible for approval of national implementation plans, preparation of five year national social development and economic construction plans, and identification and approval of foreign financed development projects;
- Ministry of Finance (MOF): responsible for all national budgeting and financial issues, and management of foreign loans;
- Ministry of Foreign Trade and Economic Cooperation (MOFTEC): responsible for management of the multi-lateral and bilateral funded projects;
- Ministry of Construction (MOC): responsible for management of urban and township infrastructures, and water supply projects;
- Ministry of Agriculture (MOA): responsible for development of agricultural sector, and rural water supply in agricultural areas, and support for construction of rural water supply systems and biogas latrines;
- Ministry of Water Resources (MOWR): responsible for development of water resources schemes, and management of rural water supply systems in water scarce villages;
- State Environment Protection Administration (SEPA): responsible for enhancement of protection of water sources and water quality;
- Ministry of Education (MOE): responsible for the construction and improvement of rural school latrines;
- Ministry of Health (MOH): responsible for preparation of mid- and long-term plans, programs and standards/criteria, providing guidance for implementation, carrying out field monitoring, supervision, inspection and evaluation; conduct regular meetings related to rural water supply, sanitation and latrine improvement, and dissemination of lessons learned in connection with rural water supply and sanitary latrines.

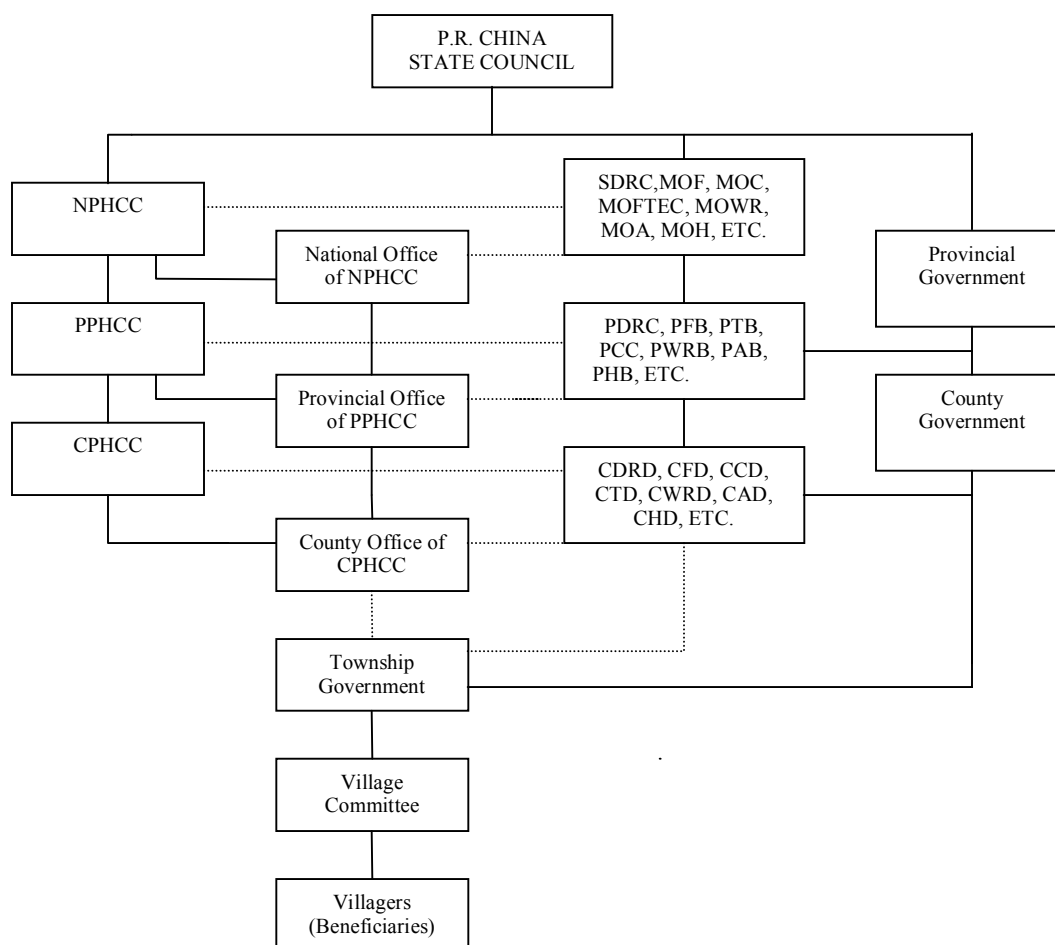


Figure 3 – Institutional Arrangements for Rural Water Supply and Sanitation Works in China.

(Solid Line = Leadership, and Dotted Line = Coordination).

- *NPHCC*: responsible for formulation of national directives, policies and strategies for patriotic health and organization of their implementation, conduct nationwide hygiene and health education, mobilization of public participation related to health activities, and planning, organization and coordination of RWSS projects among central, provincial and local institutions and governments;
- *Provincial and County Government*: oversee the implementation of RWSS projects and ensure that the directives and plans laid down by central government and NPHCC are properly implemented;
- *Local Patriotic Health Campaign Committee*: responsible for organization and coordination of rural water supply systems, sanitation and latrine improvement under the leadership of NPHCC and local governments;

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- *Local Water Resources Bureau*: responsible for organization and coordination of rural water supply systems implementation under the leadership of the local governments; and
- *Township and Village Government*: responsible for construction and O&M of rural water supply systems, sanitation and latrine improvement.

External Support Agencies and Bilateral Agencies

In the past two decades, rural water supply, sanitation and latrine improvements work in China have obtained financial support and technical assistance from international organization, including:

- United Nations Development Program (UNDP): gratuitously provided a total of US\$ 2.8 million in three different periods for (i) preparation of the RWSS project financed by the World Bank in 1980s, (ii) provision of deep well supply with hand pump and sanitation & latrine improvements, and (iii) human resources training programs for implementing rural water supply, sanitation and latrine improvement in remote and poor areas.
- IDA/The World Bank (WB): provided a total of US\$ 330.60 million loan under four projects which have been implemented since 1980s. A total of about 39,000 villages of 167 counties (banners) in 18 provinces, autonomous regions, and municipalities have benefited from the four projects (among which the projects in Yunnan, and Gansu provinces and Inner Mongolia Autonomous Region have already been expanded.) A total of close to 23 million rural population have obtained easy access to clean and safe drinking water and sanitary latrines through these projects. The IDA/WB assistance, accounted for 50 percent of the total project investments.
- UNICEF: provided US\$ 4 million in three periods for demonstration pilot projects on rural water supply, sanitation & latrine improvement works in 24 counties of 10 provinces and conduct of personal hygiene education.
- WFP: gratuitously provided 79,000 tons of wheat to assist the labor expense of workers for rural water supply projects in 10 counties of Liaoning and Shanxi Provinces.
- WHO: provided trainers and costs to conduct of training courses on water quality monitoring of rural water supply, sanitation management, and the roles of women in improvement of effectiveness of rural water supply and sanitation.
- EEC: provided 1.10 million EEC (now EU) currency units for implementation of “Sector Research and Institutional Improvement on China Rural Water Supply” in Guizhou and Gansu Provinces.
- Japanese Government: provided a total of 2.57 billion Japanese yens in 1990 and in 1994 for construction of rural water supply in Guizhou and in Jilin Provinces. A total of 653 water plants were completed in 29 counties of two provinces with a total beneficiary population of 1.44 million. The Japanese assistance accounted for 40 percent of the total project investment.
- Germany (GTZ): provided 2.20 million Marks to conduct training courses for staff who were working in the rural water supply sector in China.
- UK (DFID): provided a total of US\$ 3 million for construction of rural water supply, sanitation and latrine improvement works in Sichuan and Yunnan Provinces.

Although the financial contributions for the construction of rural water supply systems in China by these external agencies may not be significant when comparing with the total domestic investments in the past two decades, the introduction of innovative technology, modern project planning and management techniques, and O&M approaches for water systems by the external agencies have created very important and positive impacts for the sustainability of the systems built.

ii. Non-Government Organizations (NGOs)

The Government of China encourages and supports NGOs and private participation in development of rural water supply and sanitation works in China. Rural residents also welcome their participation.

Rural water supply projects launched by NGOs are jointly organized and managed by both NGO and local governments in the project areas. Currently, a large-scale rural water supply program known as “Love of Great Earth, Mother Water Cellar” is launched by the Women Federation of China which has offices at provincial, prefecture and county levels. Since year 2000, the Women Federation of China has received RMB 150 million through social donations. The donations are used to construct rural water supply systems in western poverty provinces. To date almost 1 million rural populations have benefited from the project, and their drinking water problems are resolved.

In recent years, private sector, either solely or jointly with local governments, has invested in rural water supply systems. Although the number of private investors is small, it is a good start and has positive impacts on the sector development. The local governments and rural populations welcome private investors in the sector development. In general, private investors and local governments or village committees enter agreements for the construction, O&M of rural water supply systems, with water tariffs regulated by county pricing bureau.

1.4 Funds and Financing Policies

The funding of rural water supply and sanitary latrines comes from many sources. They are: contributions from different levels of governments, village funds, and users, as well as loans, grants, and donations. The O&M costs, including credit/loan servicing, are fully financed by users through water tariffs which are regulated by county price bureaus. These financing policies have been implemented for many years and have proved to be very effective and successful. The small contributions in RWSS constructions by different levels of governments have motivated the users’ contributions that are indeed the most significant financing source. Many provinces have approved annual budgets to be spent on RWSS constructions.

Table 4 illustrates the investments on rural water supply from 1981 to 2002 (Source: National Office of NPHCC Statistics). It is noted that users have contributed 42.53 percent, or equivalent to RMB 30 billion, of the total investments of RMB 70 billion during this period. Others funds and financing sources which are loans, donations and grants from external agencies, corresponds only to 4.86 percent, or equivalent to RMB 3.42 billion during 1981 to 2002.

Table 4 – Investments on Rural Water Supply from 1981 – 2002

No	Description	Investment of Government at Different Levels Million RMB	Investments of Village Committee Funds Million RMB	Users Million RMB	Others (Loans, Donations and Grants) Million RMB	Total Million RMB
1	1981 – 1985 6 th Five Year Plan	910	1,221	1,658	129	3,919
2	1986 – 1990 7 th Five Year Plan	1,937	2,630	4,469	397	9,434
3	1991 – 1995 8 th Five Year Plan	3,656	4,002	6,530	1,074	15,264
4	1996 – 2000 9 th Five Year Plan	5,994	7,310	11,771	1,269	26,344
5	2001 – 2002	5,673	3,792	5,591	559	15,614
6	Total Investment	18,170	18,956	30,020	3,429	70,575
7	percent of Investment	25.75 percent	26.86 percent	42.53 percent	4.86 percent	100 percent

Based on the statistics of the National Office of NPHCC, the investments in sanitary latrines in China rural areas from 1996 – 2002 are depicted in **Table 5**. It is clear that the user financing is very significant, and as the incomes of rural populations are improving, future investments in sanitary latrines will depend even more heavily on user financing.

Table 5 – Investments on Sanitary Latrines from 1996 - 2002

No	Description	Investment of Government at Different Levels Million RMB	Investments of Village Committee Funds Million RMB	Users Million RMB	Others (Loans, Donations and Grants) Million RMB	Total Million RMB
1	1996 – 2000 9 th Five Year Plan	1,849	2,191	9,342	209	13,591
2	2001 – 2002	991	1,269	4,280	80	6,620
3	Total Investment	2,840	3,460	13,621	289	20,211
4	percent of Investment	14.05 percent	17.12 percent	67.40 percent	1.43 percent	100 percent

As mentioned earlier, the Government of Chinese has set 95 percent of rural populations would have access to improved water supply systems (of which 70 percent to be served by piped water supply systems) and 65 percent of rural households would have sanitary latrines, as their Millennium Development Goals (MGD) by 2010. It is certainly a great challenge for the Government of China financially to meet the MDG by 2010. The Government of China would pursue its past financing policies mentioned earlier. **Table 6** shows the unit investment costs of different water supply systems and sanitary latrines.

Table 6 – Unit Investment Costs of Different Water Supply Systems and Sanitary Latrines

No	Description	Unit Investment Cost, US\$
1	Piped Water Supply System	< US\$ 30
2	Deep Well with Hand Pump	US\$ 5 – 10
3	Rain Water Collection System	US\$ 50 – 80
4	Household Sanitary Latrine	US\$ 90 – 120
5	Public or School Sanitary Latrine	US\$ 500 – 850

The financial contributions in rural water supply and sanitation are not standardized. They depend on sources of funding. In general, the sum of financial contributions from various levels of government is about 25 percent for rural water supply projects. In the past few years, through the national policies and strategies regarding the great development of the poverty western provinces, MOF has increased its grants related to the development of rural water supply services in these western provinces. Some rural water and sanitation projects which are invested by local governments or NGOs, the government counterpart funding could go as high as 1:1 (50 percent). Some projects have low governmental financial contributions, but they have materials subsidies.

Regarding sanitary latrines, government subsidy is comparatively small, which has national average subsidy of about 14 percent of total investment needs. Very often, subsidies are in the form of provision of construction materials needed.

The counter-funding by local government for internationally financed projects is usually set at 25 percent of the total investment needs.

For very poor villages, which usually also lack nearby water sources and sanitary latrines, it is expected that governments and societies would provide even stronger support to improve their programs. It is necessary to provide additional grants to these very poor villages from governments, or the more developed regions could assist these under-developed villages.

The O&M costs for rural water supply systems mainly pay from water tariffs which are collected from benefited rural residents, and also from village committee fund. The water tariffs of rural water supply systems which are managed by village committee, generally the village committee organizes benefited rural residents and set the tariffs. For rural water supply systems which are managed by township government, water tariffs are regulated by county price bureau.

1. 5 Technology and Water Quality

The Government of China has released a series of design guidelines, design specifications, rules and criteria for engineering construction and standards, for the professionals who work in the RWSS sector. They are published in “Design Specifications for Rural Water Supply” and “Drinking Water Standards”.

The government policy is to promote piped water supply system as priority to meet the demands, and for rural villages where populations are scattered or there is no availability of adequate water source, deep well with hand pump or rain water collection systems are adopted.

The enforcement of raw water quality standards seems to be relaxed in some villages.

China's government also stipulates general and technical guidelines regarding construction of sanitary latrines in rural villages. These include full walls, roof, pit, water sealed excreta storage and treatment, good house keeping, no fly, no odor, etc.

The following types of sanitary latrines are recommended by Chinese government for implementation: three compartments septic tank, double container composting latrine with funnel squatting seat, biogas latrine, latrine with separation of excrement and urine, and latrine with complete drainage water washing.

1.6 Legal Issues

Equity Ownership

Ownership of rural water supply systems falls into the following categories depending on the scope of investments:

- For water supply system with solely private investment, equity ownership belongs to the investor;
- For water supply system with private sector participation in construction, equity ownership belongs to all investors;
- For water supply system with investment contributed from government, village committee funds, and users, equity ownership belongs to the village committee; and
- For water supply system which is managed by townships or has been entrusted the management to certain agent, equity ownership is not clearly defined.

For sanitary household, school and public latrines, no matter where the investments come from, equity ownership belongs to household, school and village committee respectively.

Exploration and Utilization of Water Resources

In accordance with the "National Water Resources Laws", for all extractions of ground water and surface water for rural water supply projects application requests need to be submitted for the intended development and utilization of water resources. Approval of application requests are issued by local water resources management offices.

Legal & Autonomous Status of Water Plants

For water plants which are: (a) built either solely or partially by private investors, (b) managed by township, or (c) entrusted the management to certain agent, registration with local industrial and commercial management bureau is required to gain legal and autonomous status. For water plants managed by village committee, usually no registration is required.

1.7 Sanitation and Health Education

In 1994, the Chinese government launched the nationwide "Health Education Actions for 900 Million Rural Population" to disseminate basic health education to rural populations. The actions called for promotion of healthy living, hygienic life style and clean living ambience, through mass media and inter-personal communication to minimize the main public health problems encountered among rural populations. Positive impacts has been achieved related to eradication of bad habits and un-hygienic life

style of rural population. The rural population is now more aware of personal hygiene and the needs of self health care.

In addition, the Chinese government also issued “China Central Committee and State Council Resolution Related to Rural Health Reform and Development”, and “Guidelines about Rural Health Reform and Development” to promote the “Health Education Actions for 900 Million Rural Populations” campaign. In February 2002, the Ministry of Health, NPHCC, the Ministry of Agriculture, the Publicity Ministry of CPC Central Committee, the General Administration of Broadcasting and TV, the China Women Federation and the Poverty Reduction Office of the State Council, jointly printed and distributed a “Five Year Plan of Health Education Actions for 900 Million Rural Populations”, which stipulated in detail the overall goals, specific goals, strategies and measurements for the health education actions.

The overall goals of the Five Year Plan for the campaign are:

- Establishment of an effective working mechanism which is led by government, coordinated by multiple ministries and institutions, and participated by the whole society;
- Dissemination of basic health and hygiene knowledge to help rural populations to develop a scientific, civilized and healthy life style;
- Improvement in the level of health, and quality of life of rural populations;
- Promotion of protection and construction of a healthy ecological environment in rural areas; and
- Promotion of rural health and hygiene in line with sustainable economic development of rural areas.

The specific goals of the Five Year Plan are:

- By 2005, the percent coverage of offering a health and hygiene course in primary and high schools in rural areas of eastern, central and western China reaches 90 percent, 80 percent and 70 percent respectively;
- By 2005, 90 percent, 70 percent and 50 percent of the township health centers, and village health offices in eastern, central and western China rural areas respectively can provide health consultation, behavior intervention, and other kinds of health education services for rural populations;
- By 2005, training of key health education personnel working in the Five Year Plan at village level in eastern, central and western China rural areas is targeted at 90 percent, 80 percent and 70 percent respectively;
- The percent of coverage of rural peasants knowing of essential annual information of the Five Year Plan is targeted at 80 percent, 70 percent and 60 percent in eastern, central and western China rural areas respectively;
- The percent of coverage of rural peasants possessing appropriate health and hygiene behavior is targeted at 70 percent, 60 percent and 50 percent in eastern, central and western China rural areas respectively;
- The percent of coverage of primary and high school students knowing of essential annual information of the Five Year Plan is targeted at 85 percent, 75 percent and 65 percent in eastern, central and western China rural areas respectively;

- The percent of coverage of primary and high school students possessing appropriate health and hygiene behavior is targeted at 70 percent, 60 percent and 50 percent in eastern, central and western China rural areas respectively;
- By 2005, the percent of cigarette free primary and high schools is targeted at 20 percent. The smoking conditions of population over 15 years old should be under effective control.

2. Implementation and Impacts of IDA/World Bank Financed China Rural Water Supply and Sanitation Projects

International and bilateral organizations have provided valuable support and financial assistance to the implementation of RWSS projects in China's rural areas in the past few decades. Among the active international and bilateral communities, the World Bank has been most active in the sector development. Due to restriction regarding the length of this paper, it will focus only on the World Bank financed RWSS Projects.

2.1 Brief Description

Since 1985, the World Bank/IDA has supported four projects related to RWSS in China. The first project supported only water supply project. The followed three projects have added sanitation and health education components to enhance the positive impacts to rural populations. The objectives of the later three projects were to provide access to safe, conveniently located water to national- or provincial-level poor counties, and to improve related water and sanitation practices.

The four World Bank financed RWSS projects were implemented in 178 counties in 18 provinces. **Figure 4** shows the participating provinces of these projects (1985 – 2005).

The total investment of the four projects is US\$ 686 million, among which, the World Bank credit/loan accounted for US\$ 331 million. A total of 6,042 piped water supply systems and 65,772 non-piped water supply systems were or will be constructed, after which close to 25 million rural residents would have access to safe water supply. Among the benefiting rural residents, 97 percent. have access to piped water supply systems. Under the four projects, 64,500 public, school and household sanitary latrines were built or will have been built, and numerous persons have attended health education programs.

A summary of the four IDA/World Bank financed projects is shown in the following **Table 7** (at end of paper).

2.2 Project Financing

The World Bank contributed 50 percent of the total project costs. The Chinese government at different levels (provincial, prefecture, county and township) contributed another 25 percent, and the benefiting villagers contributed the remaining 25 percent (partially in kind of labor). Through tariffs, the

beneficiaries repay the county the 50 percent of the capital costs covered by the World Bank loan/IDA credit.

The Ministry of Finance (MOF), which is responsible for the borrowing and repayment of the World Bank loan/IDA credit, on-lended the funds/credits to local governments at different levels. The provincial finance bureaus bear the risks of the currency exchange rate. Repayment of the loan/credit is through water tariffs which are regulated by county price bureaus.

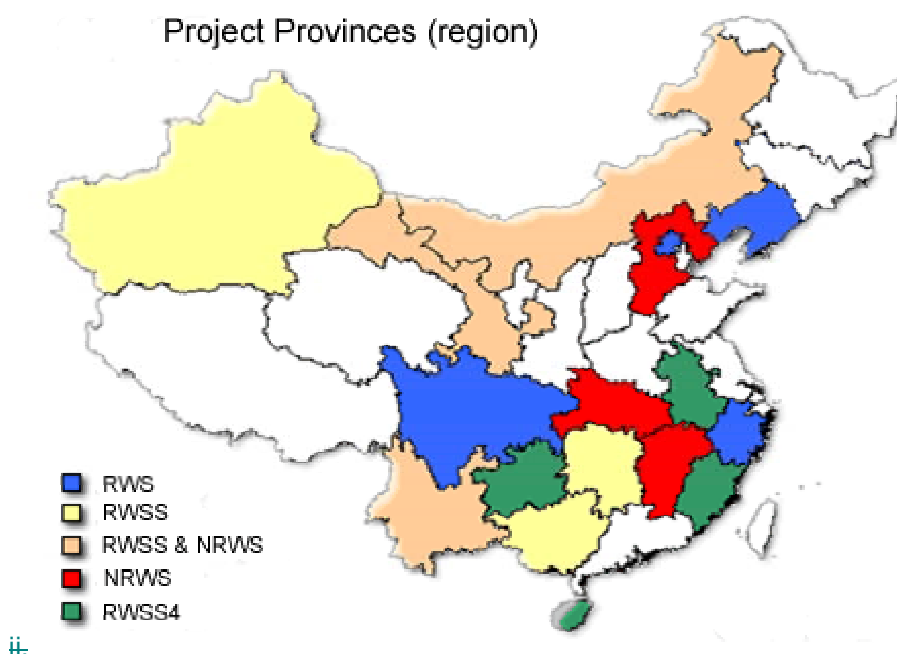
2.3 Institutional Arrangements and Responsibilities

The responsibilities for project management and implementation are divided among national, provincial and county levels. At each level, Leading Groups were established to provide policy guidance and advice of an inter-sectoral nature. Their responsibilities include:

- Formation and staffing of project offices;
- Oversight of project offices;
- Resolution of policy issues that arise during project implementation; and
- Coordination of project issues across project related government bureaus.

The National Leading Group is headed by the Minister of Health. Provincial Leading Groups are headed by standing vice-governors responsible for health matters, with at least two bureau directors as members. County-level Leading Groups are headed by county magistrates and such bureau directors as the magistrate deems important to project execution.

Figure 4 – Participating Provinces in the Four World Bank–Financed RWSS Projects (1985–2005)



The composition and the specific implementation responsibilities for the project management offices at each level are as follows:

National Project Office (NPO): The NPO was set up under the Department of Disease Control (NPHCCO) of Ministry of Health (MOH). Its office is part of the China Rural Water Supply and Technical Center, which provides logistical support to the NPO. The NPO is responsible for:

- Organization, coordination, training, supervision, monitoring and control of the overall project implementation.
- Baseline surveys.
- ICB procurement of project goods and materials.
- Appraisal and approval of designs of water supply works with an investment over US\$350,000 and examination and acceptance of their quality and completion.
- Consolidation of project reports, annual work plan, accounting and auditing reports.

Provincial Project Offices (PPOs): The PPOs work under the guidance of provincial-level Leading Groups and were drawn from provincial bureaus, in particular the public health bureau, water resources bureaus, patriotic health campaign committee offices, etc. The PPOs are responsible for:

- Organization, coordination, training, supervision, monitoring and control of the project implementation of their own provinces

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- Appraisal and approval of designs of all water supply works with an investment above US\$60,000 but not exceeding US\$350,000, and examination and acceptance of their quality and completion
- Management of civil works procurement of water supply works with an investment budget exceeding US\$ 100,000
- Consolidation of project reports, annual work plan, accounting and auditing reports.

County Project Offices (CPOs): The CPOs work under the guidance of county-level Leading Groups and were drawn from county bureaus, in particular the public health bureau, water resources bureaus, patriotic health campaign committee offices, etc. The CPOs are responsible for:

- Organization, coordination, training, supervision, monitoring and control of the project implementation of their own counties
- Appraisal and approval of the designs of all water supply works with an investment less than US\$ 60,000, and examination and acceptance of their quality and completion
- Management of civil works procurement of water supply works with an investment budget less than US\$ 100,000
- Consolidation of project reports, annual work plan, accounting and auditing reports.
- Support of operation and management of water supply systems.

Project township (town) governments and village committees are required to help CPOs to fulfill the organization, coordination and implementation of the projects. They provide in-kind contribution of labor and materials needed for construction of the water facilities, and coordinate with the County Finance Bureaus repayment of the loan or credit.

2.4 Impacts of World Bank/IDA Assisted Projects

Concerning the impacts of the World Bank/IDA assisted projects, some are straightforward and others might need more evidence and research to confirm its full impact. Nevertheless, where improved water supply systems have been installed, and complemented by health and hygiene education and improved sanitation facilities, the project areas have shown remarkable social, economic and health benefits. The following gives some specific examples to indicate the achievements.

Social Benefits for the Poor, Minorities and Women

Traditionally, the poor and many minorities in China are living in villages where clean water sources are not conveniently access. Women and children in most households are frequently responsible for fetching water for meeting their daily needs. The implementation of the World Bank/IDA assisted projects has reduced the burden of women and children in fetching water daily so that the time saved can be used for other activities, improving their quality of life

Comparing the results regarding time savings in water fetching between baseline survey and follow-up survey of 11,313 households in the NRWS project in Hebei, Hubei, Inner Mongolia, Jiangxi and Yunnan provinces (autonomous region) in 2001, show that before the water supply improvement, each household needed 20 to 60 minutes per day for water fetching, and the water fetching times

increased in drought seasons which lasted for 3 to 5 months. After access to piped water supply systems, each household saved 183 hours per year, assuming that they earlier spent 30 minutes per day to fetch water. The saving in time can now be spent on more productive activities such as children education, cultivation, improved house keeping, etc.

Health Behavior Changes of Rural Residents

The results of the follow-up survey in 2001 for the NRWS project in 48 villages with access to piped water supply systems in Hebei, Hubei, Jiangxi, and Yunnan provinces and Inner Mongolia autonomous region show that:

- The water consumption of the rural households increased from 20 liters per capita per day in baseline survey period to 41.1 liters per capita per day
- The coverage rate of sanitary latrine for the rural households increased to 22.9 percent from 4.2 percent in baseline survey period.
- For the primary school students, the hand-washing rate before meal increased from 72.5 percent to 88.5 percent, the rate of hand-washing after using toilet increased from 56.4 percent to 71.6 percent, and the rate of nail-cleaning increased from 36.1 percent to 55.9 percent; for the housewives, the rate of hand-washing before meal increased from 24.7 percent to 71.5 percent, the rate of washing hand with soap increased from 65.3 percent to 91.5 percent, the rate of washing melons and fruits before direct eating increased from 33.8 percent to 76.5 percent, the rate of washing bowls without using dish cloth increased from 45.6 percent to 77.7 percent.
- The rate of kitchenware and meals with fly resistance covers increased from 60.8 percent to 91.9 percent; the cleaning rate of water cistern increased from 55.7 percent to 94.3 percent; and the acceptability rate of kitchen increased from 7.4 percent to 34.8 percent.

Improvement of Health of Rural Residents

The followings facts indicate that the health of rural residents has significantly improved where improved water supply systems, health and hygiene education, and improved sanitation facilities have been implemented in villages. However, these are only specific cases and more evidence and research is required to fully support these findings.

- Based on the survey of Liaoning PPO for RWS project on the drinking water situation of 1.11 million people having access to clean water served by 292 project water plants, the incidence rate of enteritis decreased by 87.7 percent, that of dysentery decreased by 80.4 percent, that of hepatitis A decreased by 78.1 percent. After water improvement in areas with high fluoride concentration in water, no newly cases of fluorosis were detected.
- Based on the investigation of Yingkou CPO for RWS project in Liaoning province on the incidences of intestinal diseases of enteritis, dysentery and hepatitis A in 29 project villages and 24 non-project villages from 1985 to 1986, after one year implementation of the project, the incidence of intestinal diseases of rural beneficiary of the project villages decreased 68.47 percent, while that of no-project villages decreased only 29.9 percent.

Table 8 - Intestinal Diseases in Yingkou County, Liaoning Province

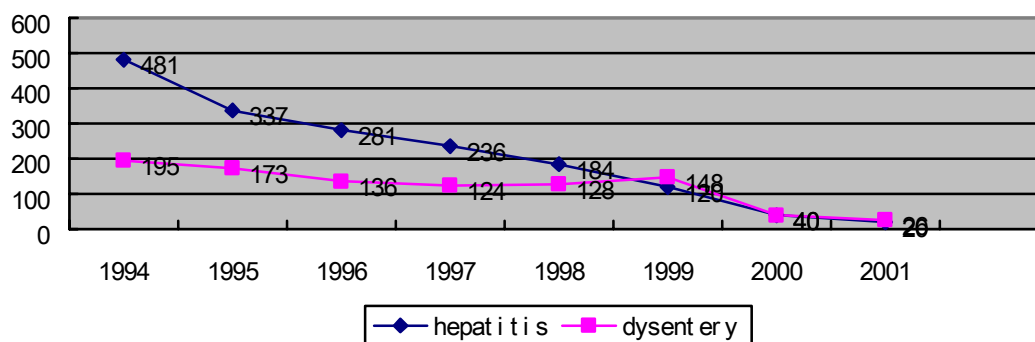
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Project Diseases	29 project villages				24 non-project villages			
	1985	1986	Cases decreased	decrease □ percent □	1985	1986	Cases decreased	decreased □ percent□
Hepatitis A	140	66	74	52.86	128	82	46	35.94
Dysentery	373	144	229	61.39	296	140	156	52.71
Enteritis	1654	473	1181	71.40	1335	1011	324	24.27
Total	2166	683	1483	68.47	1759	1233	526	29.90

• According to the e

statistics of the hospitalization cases on the incidences of hepatitis A and dysentery before and after implementation of the project by No. 2 People’s hospital of Linxia county of Gansu province for the RWSS project, the number of patients with hepatitis A decreased from 195 in 1994 to 36 in 2001, the number of patients with dysentery decreased from 481 in 1994 to 20 in 2001, a decrease rate of 95.8 percent (see Figure 5 below).

Figure 5 – Intestinal Disease Changes as Reported by No. 2 People’s Hospital of Linxia County, Gansu Province



Income Generation of Rural Residents

Although income generation of rural residents after the implementation of improved water supply systems, health and hygiene education, and improved sanitation facilities, has not been studied comprehensively, the following survey findings indicate that the projects have had positive impacts in terms of income generation of rural residents.

Based on a survey of the RWS I Project conducted by the Liaoning PPO, in the benefited villages of 292 improved water plants, the number of township and household businesses have increased by 76.3 percent from that before project implementation.

Based on the survey results of the RWSS II Project conducted by Inner Mongolia PPO, 280 households in Xiju village in Tumotezuo banner enjoyed an increase of village income by 94,000 RMB one year after implementation of water supply project. The increase of village income was due to the fact that villagers had time and water to grow vegetables, grapes and apple trees. Similarly, in Jiuyingzi village of Tongliao city, benefited households had more time and water to feed more pigs, and it increased their average annual income by 1,000 RMB per household. It was also reported that some of the

benefited villagers had invested in green house plantation to extend the period of growth of vegetables, and had increased their annual earnings by 2,000 RMB per household.

Based on the survey of the RWSS II Project conducted by Linxia CPO of Gansu province, the implementation of RWSS project had facilitated for the benefited villagers to invest in agriculture, forestry and animal husbandry activities. The local statistical bureau and Finance Bureau reported that the number of green house plantations had increased to 597 which generated a total vegetable outputs of 6 million RMB per annum. The average per capita net income of the benefited villagers was 1,486 RMB in 2002, about 2.4 times of that when the water supply project was launched in 1993. In addition, due to the development of the local economy, water consumption had also increased, resulting in more profit by the water supply plants.

The following is the change, before and after implementation of RWSS II Project in Yinwang Village, as reported by the Linxia County Project Office, Gansu Province.

Basic situation: There are 612 households and 3,125 people in Yinwang Village. Before the project, the residents consumed polluted river water for irrigation and cellar water for drinking purposes. During the 3 months drought season, the rural residents had to fetch water several kilometers away from their homes. The economic standard was very poor at that time. Since 1995, they have access to piped water supply through the implementation of RWSS II Project.

Increase of economic income: At the start of the project implementation in 1993, the income of villagers was only 625 RMB per capita per year. In 2002, the income had increased to 1,580 RMB. The average annual income increased 2.5 times.

Decrease of water-borne diseases: In 1993, 214 people suffered from dysentery and 82 from hepatitis; in 2000, 23 people suffered from dysentery and 26 from hepatitis; by September 2003, only 11 people suffered from dysentery and 26 from hepatitis. By 2000 and by September 2003, the number of rural people suffering from dysentery and hepatitis decreased by 89.25 percent and 94.86 percent, and 70.73 percent and 68.29 percent respectively.

Labor force saving: It was reported that each household was able to save 10 percent of the workday after they were served by piped water supply.

Development of livestock: **Table 9** shows the number of livestock kept by the benefited villagers before and after access to piped water supply system.

Table 9 – Comparison of Livestock Kept by Benefited Villagers in 1993 and in 2000

	Sheep No.	Cattle No.	Pig No.
1993	196	68	457
2002	974	238	1224
Increase Times (2002/1993)	5.0	3.5	2.7

Note: Assuming the following unit sales prices, i.e. 350 RMB/sheep, 2,000 RMB/cattle and 420 RMB/pig, the total income increase of the benefited village was 956,900, RMB in 2002, or equivalent to average 1,563 RMB per household in 2002.

Development of greenhouse plantation. There were only 9 mu of green house plantation in 1993 and it had then increased to 122 mu in 2002. In other words, 13.65 times that of 1993. Assuming the

average annual income of vegetable per mu is 10,000 RMB, the new development had generated on average 1,993 RMB per household.

In 2002, the annual average per capita income in Linxia County was 1,162 RMB, while the income in Yinwang Village was 1.36 times that of the county average. The former poor village has enjoyed better living standards after access to clean and reliable water supply.

3. Main Factors Driving the Implementation Process of World Bank/IDA Assisted Projects

3.1 Political and Economic Climates

The scaling up and achievements of RWSS in China are closely linking to the political and economic climates of the country in the past two decades as described below:

Stable Political Situation and Rapid Economic Growth

Since the launching of the reform and open policy, China has enjoyed a long period of political stability, and its people have also enjoyed stable and peaceful living. The long period of stability of the country, both in political and civilian living climates, and also the evolution of socialism market economy have provided a macro environment which has been ideal for rapid economic growth. As the country economy grows stronger, and the incomes of the rural residents improve, both local governments and rural residents are capable to gather more funds to improve their existing water supply sources and latrines.

Determination and Commitment by the Government of China to its Rural Residents

The rural water supply, sanitation and latrine improvement program forms an important content of the poverty reduction plan of the Government of China. The program is not only a core activity related to the improvement of health and well being of rural residents, it is also an important infrastructure development to promote economic growth in rural areas. In the past two decades, the Government of China has paid great emphasis on the sector development, and has set progressive improvement targets related to investments in rural water supply, sanitation and latrine improvement. The persistent determination and commitment of the Government of China to its rural residents are reflected as “goals” in the national social development and economic construction plan for implementation. Every five years, the state leaders call for a high level planning meeting to conclude past achievements and to draw up a new development plan for the sector. The meeting releases sector policies which are most suitable for China’s situations, and provides guidelines for sector development works. It also oversees institutional arrangements through setting up of a leading cum coordination institution and cross-sectoral working mechanism, as well as delineation of clear responsibilities of concerned departments to work together effectively.

Strong Capability Related to Resource Mobilization

The Government of China has a strong capability related to resource mobilization which is one of the main factors that drove the implementation process of the World Bank/IDA assisted projects. While the central government has injected huge capital to support the rural water supply, sanitation and latrine improvement projects, it has also mobilized concerned departments to attract multi-lateral or bilateral

funding or technical assistances to invest in the sector. In addition, the China government also encourages and supports NGO and private participation in the sector development. The central government policies, strategies and plans are well received and strongly supported by local governments at different levels, as well as by the rural residents.

Well Developed Administrative and Management Arrangements

Through implementation of rural water supply, sanitation and latrine improvement projects, the China government has developed, from top to bottom, an effective administrative and management arrangements for project implementation. It makes use to the fullest, from top to bottom, the existing administrative and management arrangements in various departments for the sector development. No matter if it is a domestic investment project or a joint venture project, well developed administrative and management arrangements are effectively implemented from the stage of project identification, approval, implementation, inspection, monitoring, hand-over, statistics, assessment, and financial management.

Strong Demands from Local Governments and Rural Residents

Rural water supply, sanitation and latrine improvements have remarkable effects on enhancement of living quality and health of rural residents, and on promotion of rural social and economic development. The rural residents have witnessed and experienced decrease of water-borne diseases, hygienic improvements, and other benefits, including freeing up time for incremental income generation. It has become a development trend and sign of modernization to have piped water systems and sanitary latrines. Local governments at different levels and rural residents have growing demands and enthusiasm for rural water supply, sanitation and latrine improvement activities.

In Line with Comprehensive Improvement & Reform of Villages

The central government has a series of strategic activities in connection with comprehensive improvement and reform of villages in China. For examples, the Ministry of Construction (MOC) is implementing its planning for rural township town development and construction; the State Environment Protection Administration (SEPA) is conducting “Environmental Scenic Village and township” campaign nationwide; NPHCC is awarding “China Hygienic Township”, “China Top 100 Best Rural Water Plants”, and “Outstanding Rural Water Plant” campaigns. All these activities have clearly specified the criteria and standards required in rural water supply and sanitation. Through these activities, it has motivated local government and rural residents to invest in rural water supply, sanitation and latrine improvements.

Political Willingness to Charge Appropriate Tariffs for Water Supply

Through the progress of its reform and open policy and promotion of market economy in the past two decades, investments in rural water supply projects are not any longer considered as social welfare activities. The political willingness to charge affordable tariffs for water supply to be borne by the benefited rural residents has paved the ways for the implementation of rural water supply. As earlier mentioned, water tariffs are regulated by county price bureaus with high degree of transparency and community participation.

Incentives for Government and Villagers to Recover Costs

Governments at all levels and rural residents have shown their acceptance to a full costs recovery approach within the affordability of the rural residents. However, not all villages which do not have easily access to clean and safe water sources are able to participate in a full cost recovery approach of investments in the sector in the initial years. As economic situations of local governments are improving, more villages are able to accept the full cost recovery approach of sector investments.

3.2 Institutional Innovation

Decentralized Approach to Service Delivery

The central government policy to decentralize the implementation of rural water supply to the lowest appropriate level, typical township government or village committee, with governments at higher levels to provide overall project design, guidance, monitoring and quality control, has proved to be effective in sector development and investments.

Cross-Sectoral Collaboration to Promote “Three-in-One” Approach

The simultaneous implementation of rural water supply, sanitation and health education for rural residents, known as “Three-in One”, has been tested internationally and has been concluded as a successful experience for replication. Its replication in China’s rural areas calls for governments at different levels to organize cross-sectoral collaboration of health bureau, water resources bureau, etc for its implementation. In multi-lateral or bilateral assisted rural water supply, sanitation and latrine improvement projects, this institutional innovation approach has broken the traditional compartmental responsibilities. Technical, financial and operational staff is lent from concerned bureaus/departments to form a project implementation and management office.

Flexibility in Investment and Management Models

Traditionally, rural water supply investments are organized by township governments or village committees, and their management is very crude. During the progress in reform and open policy, the investment and management of rural water supply plants have adopted a more scientific approach with all forms of flexibility encouraged. Sector investments could come from other provincial governments, private investors, joint investors, domestic and foreign grants or loans etc. Regarding water plant management, it is mainly the responsibility of township government or village committee. Other management models such as appointment of individual manager or other institution, set-up holding company, apply competitive bidding, etc., are all welcome.

Competition in Hiring of Water Plant Staff

More local township governments and village committees are accepting a competitive approach in hiring water plant staff. The hiring approach offers opportunity to recruit qualified staff for the operation and maintenance of water plants

3.3 Learning & Experimentation

Community Participation Approach

The service target of rural water supply, sanitation and latrine improvement is rural residents. It is important and necessary to seek good solutions that can motivate and guide the rural residents to

actively participate in the sector development and investment. Through our past experiences gained in participation of multi-lateral or bi-lateral projects, we concluded that the following are good ways to ensure successful community participation:

- During the project preparation and implementation process, adopt the approach of conducting our health and hygiene education to disseminate to rural residents the objectives and effectiveness of the intended project implementation and arouse the rural resident participation for the project.
- Water plant engineers conduct consultative meetings regarding existing water consumption behaviors and habits, preferable new water supply facilities, potential and preferable water sources and water quality, water demands, economic and financial issues, separately with rural residents, village committees, township government leaders.
- Based on local water source situations, living conditions, preferable water supply facility of rural residents, economic conditions, etc., water plant engineers present all possible project options to the rural residents, and explain to the rural residents the reasons for the selected option based on technical, and financial analysis.
- Village committee organizes villagers meeting to discuss and approve the proposed project option. Upon approval of the proposed project option by the villagers, village committee would officially forward its acceptance letter to township government, together with their commitment letter of counterpart funds, funds in lieu of labor, loan repayment, etc. In case villagers opt for higher technological option and they are willing to pay additional and higher counterpart fund, it is generally accepted by the township government.
- Regarding rural sanitary latrines options, local technicians will propose a few options which are suitable for local situations as well as accepted by local rural residents.
- Village committee adopts competitive approach in hiring water plant staff. Usually they are qualified candidates from the benefited village. Once selected, water plant staff will receive and pass a series of training courses before commencing their duties.

The above-mentioned community participation approach has gradually been adopted by local governments.

Scientific Construction and Systematic Management Approach

In rural areas, there is a lack of design engineers, and publications related to rural water plant design, O&M of water plants, Accounting of Water Plants, etc. This has led to some water plant designs which are technically not rational, and management of water plants that is weak. Similar problems are encountered in investment of rural sanitary latrines. During the past implementation of internationally assisted rural water supply projects, NPHCC has adopted a scientific construction and systematic management approach to overcome common weaknesses in construction and management of rural water supply projects, and its efforts are rewarded.

Regarding construction management, NPHCC has released the following publications to help and guide engineers to carry out engineering design works:

- Design Standards for China Rural Water Supply Engineering.

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- Standards for Implementation of “Drinking Water Standards” in Rural.
- Planning and Design Manual for China Rural Water Supply Engineering.
- Construction Manual for China Rural Water Supply Engineering.
- Standards for Construction of Sanitary Latrines.
- Expert Appraisal System for the World Bank Loan Rural Water Supply Engineering Design Options.
- Expert Appraisal System for the World Bank Loan Construction Financing.

NPHCC proposes the following standards to be considered for design of rural water supply plants:

- Comprehensive water demand per capita per day for southern and northern China is 80 – 100 lcpd and 60 – 80 lcpd respectively
- Unit investment cost per person is maximum US\$ 30

In general, per person investment cost of a rural water plant must be controlled below US\$ 30. If a water plant has unit investment cost exceeding US\$ 30, it needs to apply for review and approval by National Project Office.

Regarding O&M and management of water plants, NPHCC has released the following publication to help and guide rural water plant managers, operators and technicians to manage their plants:

- Operation and Maintenance Manual for China Rural Water Supply Engineering.
- Financial Management and Accounting Manual for Rural Water Supply Engineering.

The above-mentioned publications have laid good foundation for design, construction, O&M and management of rural water plants, with its final goal of meeting its sustainability requirements.

Total Cost Recovery and Sustainability.

The needs for total cost recovery and sustainability of investments in rural water supply plant have received special attention by local governments and concerned sector departments. For the World Bank assisted rural water supply projects, the following measures have been implemented in order to ensure total cost recovery and sustainability:

- Enhancement of Public Awareness Related to Water Tariff Payment: During the project implementation, dissemination of the importance to drink clean and safe water, the water is a commodity, the rationale for payment of water tariffs, etc. to enhance public awareness. Rational Control of Per Person Investment and Setting of Affordable Water Tariffs: NPHCC recommends that per person investment cost for rural water supply should be controlled under US\$ 30, and water tariffs for piped water supply systems should be set below US\$ 0.30/m³, or less than 3 percent of the annual net income of rural residents. For deep-well hand pumps and rain water collectors, no water tariff is collected and construction of these non-piped systems is partially subsidized by governments.

- Water Tariffs for Piped Water Systems Regulated by County Price Bureaus: Water tariffs are collected at a level sufficient to cover O&M costs, administrative costs, taxes, depreciation, and debt service requirements.

Through the above-mentioned total cost recovery and sustainability measures which are implemented under all the World Bank/IDA assisted projects, other rural water supply projects which are financed by local governments are also adopting a similar approach to recover their investment costs.

3.4 External Catalyst

Lifetime Skill Training Approach

The China government and the World Bank/IDA assisted projects have agreed to provide training to all levels of the project staff and participating agencies. This aspect had not been emphasized in past sector development and investment. More and more sector investment projects call for a life time skill training approach. The objective of a life time skill training approach is to enhance the sustainability of rural water supply systems through minimization of the total costs.

Three-in-One” Approach

The “Three-in-One” approach has been tested and proved to be very effective for achieving the investment objectives of rural water supply, sanitation and latrine improvements. The approach will be adopted for all future sector development and investments.

Development of Market Economy Management Model

As mentioned in **Para 1.1**, there are about 210 million rural residents who have no access to safe, conveniently located water sources. In particular, among these 210 million rural residents, some are living in very remote and extremely poor areas. The remaining task to achieve MDG’s goal is still enormous, in particularly, large sums are needed for investments. However, the market economy management model which has been introduced by the World Bank/IDA in its four supported rural water supply and sanitation projects in China has proved to be feasible for scaling up services for the poor in China.

4. Lessons Learned

There are nine key lessons from the China rural water supply and sanitation scaling up services for the poor during the past few decades. These are described below.

4.1 Need for Strong Leadership’s Determination and Commitments

Rural water supply and sanitation scaling up services for the poor is not just major technological and economic issues, but a major political issue. For a few decades, the Government of China has been regarding development of rural water supply and sanitation as an important component for poverty reduction of the poor. Previous experience has shown that the success projects have strong leadership’s determination and commitments to improved rural water supply and sanitation not only at national level, but also at provincial and local levels.

4.2 Need for Simple and Clear Policies

Although there is no lacking of sectoral policies, rural water supply and sanitation scaling up services for the poor need simple and clear policy to suit China conditions. The centralized-decentralized policy, cost recovery policy, and capacity building at all levels policy have proved to be very effective in past scaling up services.

4.3 Need for Non-Complicated Institutional Arrangements for Leadership and Inter-Department Coordination

Like many other developing countries, there is no single agency or ministry that has an overall mandate for development of rural water supply and sanitation projects. Overlaps of activities exist in institutions at national, provincial, county and village levels in China. In order to scale up the services, the Government of China has maintained its existing institutions with clear roles of responsibilities at all levels, and newly set up the NPHCC as a coordinating committee with similar committees and offices at provincial and county levels to organize and coordinate rural water supply and sanitation project implementation. This simple, but effective institutional arrangement has proved to be an indispensable factor for the successful scaling up of services in China.

4.4 Need for Community Participation.

The need for community participation has consistently proved to be important for successful implementation of rural water supply and sanitation projects in China. There have been cases where inadequate community participation has led to delay or even failure in project implementation. Community participation must start during the project identification and preparation stage, and it must also be a continuous process. A good community participation project will further endure sustainability.

4.5 Cost Recovery: Willingness to Contribute Financially

The reform and open policy, and market economy strategy stipulated by central government nationwide has positively influenced the rural residents' thinking that water is a commercial commodity and that they have to pay for it for better and convenient services. The central government has also set clear policy that rural water supply investments must be charged for its sustainability. The full cost recovery policy within the affordability of rural residents has been well accepted by provincial, county, township governments, village committee, and rural residents. In most cases, the O&M costs of rural water plants are also fully financed by rural residents through water tariffs which are regulated by county price bureaus.

These financing policies have been implemented for many years and have proved to be very effective and successful. The small contributions for RWS&S constructions by different levels of governments have motivated rural residents' contribution as indeed the most significant financing source. Many provinces have approved annual budgets to be spent on scaling up RWS&S for the poor.

4.6 Need for Capacity Building

Previous experiences have shown that capacity building in project management, simple accounting, appropriate design, quality operation and maintenance at all levels, are essential for sustainability of

rural water supply and sanitation schemes. A life time skill training approach has been introduced to enhance the sustainability of rural water supply and sanitation projects.

4.7 Need for Technical Assistance from International Organizations.

Although training is highlighted in past rural water supply and sanitation projects, the impacts of training do not always match the efforts spent on it. The participation of international and bilateral organizations in the sectoral development has introduced innovative and useful technical assistance to rural residents. This results in increased productivity and high performances in connection with project implementation.

4.8 Need for Sharing of Knowledge and Understanding.

Prior to decentralization of responsibilities to provincial, county, and township governments, village committees, and rural residents, the NPHCC has taken a lead in sector coordination and dissemination of central government policies, strategies, objectives and action plans related to the sector development and investments. Series of meetings and visits are usually conducted to ensure that a common view of sector objectives and elements, as well as the roles and responsibilities of relevant actors, are shared and understood correctly and clearly.

Almost all successful and sustainable rural water supply plants in China have the following key characteristics: that there exist (a) a common view of sector development objectives and elements, and (b) understanding and support by county and township governments, village committees and rural residents.

4.9 Need for Integration of Sanitation and Health Education with Water Supply

Based on the experience from past projects suggests that the “Three-in-One” approach in implementation of rural water supply, sanitation and latrine improvements is very effective in the betterment of quality of life for the rural residents in China, it is important to continue the emphasis on health and hygiene education, rather than physical sanitation investments only. Existing survey results seem to suggest that traditional approaches and measures in dissemination of health and hygiene education may not be sufficient. Thus, it is necessary to shift future health and hygiene education from the current 'promotion' mode to an 'education' mode: hygiene needs to be marketed as an attractive concept to consumers rather than “taught”.

5. References

Wang Longde: Introduction of the Implementation of the World Bank assisted China Rural Water Supply and Sanitation project, materials for the World Bank International Symposia, May 1998

Liu Jiayi: Introduction of the Implementation of World Bank assisted China Rural Water Supply and Sanitation project, materials for the World Bank International Symposia, July 2000

CASE STUDIES IN SCALING UP POVERTY REDUCTION

Parameswaran Iyer: Willingness to Accept and Pay: China rural water supply and sanitation project financed by the World Bank, 2002

Tao Yong: The Benefits Assessment of Rural Water Supply in Hetian County of Xingjiang Uygur Autonomous Region, July 1999

NPHCC: Materials for the Fourth Workshop on National Rural Water Supply and Latrine Improvement, March 2002

NPHCCO: Statistic Data on Nationwide Rural Water Supply and Latrine Improvement, Annually Follow-up Survey Evaluation Report for the projects in 2001: WB Credit No. CRN0.027CHA, July 2002

Feng Guangzhi: Management System Innovation for Rural water Supply, “Love of Mother Earth, Mother Water Cellar” International Forum, February 2003

General Office of MOH: Health Education Action Plan for 900 Million Rural Residents in China, February 2002

Linxia County Project Office, Gansu Province: Summary of the Poverty Alleviation and Benefit Enhancement of Rural Water Supply and Sanitation Project by the WB, October 2003

Yingkou CPO for Rural Supply, Liaoning & Epidemic Prevention Station of Yingkou in Liaoning: Benefits Analysis of Rural Water Supply Project assisted by WB, April 1987

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Table 7 – Summary of the IDA/World Bank Financed RWSS Project (1985 – 2005)

RWSS Project	Loan Number	Total Capital Investment, Million US\$	World Bank Loan/IDA Credit Million US\$	Number of Piped Water Supply System	Number of Non-Piped Water Supply System	Total Number of Water Supply System	Benefiting Rural Residents, Million persons	Number of Sanitary Latrines	Number of Persons -Obtaining Training, Million	Period of Implemen -tation	Participating Municipality /Province
I	1578-CHA	263	105	2,699	131	2,830	7.4	-	-	1985 – 91	Beijing, Liaoning, Sichuan, Shanxi, Zhejiang
II	2336-CHA	191	110	2,077	63,304	65,381	9.3	39,300	9.4	1992 – 98	Ganbsu, Guangxi, Hunan, Yunnan, Inner Mongolia, Xinjiang
III	NO27-CHA	140	70	878	2,337	3,316	4.6	14,600	3.3	1997 – 2003	Hebei, Hubei, Jiangxi, Yunnan, Inner Mongolia, Gansu
IV	3233-CHA	92	46	287	-	287	3.1	10,600	2.3	1999 – 2005	Anhui, Fujian, Hainan, Guizhou
Total	-	686	331	6,042	65,772	71,814	24.4	64,500	15.0	-	-

