Development of Sustainable Water and Sanitation Systems in Rural Areas of CAREC Region: Cases from China, Mongolia, Tajikistan, and Uzbekistan

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General overview of the WASH challenges

- ***Poor technical condition of WASH infrastructure*** due to the lifetime of more than 50 years (Tajikistan, Uzbekistan);
- ***Population growth requires construction of new systems*** to provide access to drinking water;
- ***Level of living standards is decreasing in rural areas*** due to the inequitable access to WASH between urban and rural areas;
- ***Lack of human capacity*** for proper operation of WASH systems;
- ***Insufficient financing*** of WASH systems' O&M and development of new WASH systems (low tariffs and low service fee collection rates)

China case study: Use of new energy in water supply system of Gangcha County (Under the program of China' Institute of Water Resources and Hydropower Research (IWRHR) and Qinghai Institute of Water Resources (QIWR))

Location: Gangcha County of Huaibei Tibetan Autonomous Prefecture, China.

Main challenges: pasturing area with a relatively dispersed population, drinking water is supplied mostly via decentralized systems (wells).

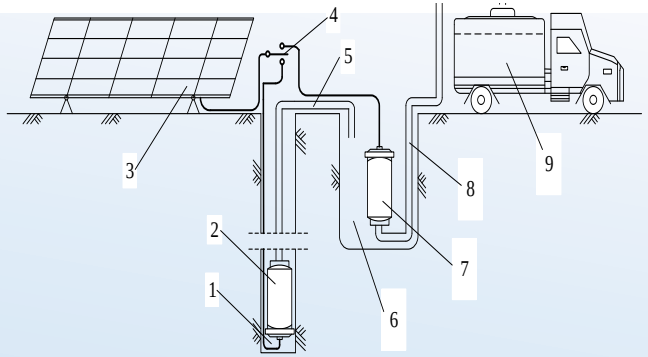
Main goal: Provide access to drinking water supply for the villagers of 3 remote settlements by using advanced alternative water sources.

Main approach: 3 different water supply technologies using new (renewable) energy: (a) solar-powered motor-pumped well, (b) shafts using solar-powered water pumps and (c) motor-pumped wells using solar and wind power.

Financial aspects: Supported by the Research and Application Special Fund (RASP) of Qinghai Province and the central finance. The costs are:

- *Solar-powered motor-pumped well* (can operate with insufficient sunlight) = 1028 USD/family
- *Solar-Powered Water Pump Shaft* (cannot operate without sufficient sunlight) = 785 USD/family
- *Motor-Pumped Wells Using Solar and Wind Power (have* possibility of switching between solar and wind power) = 10 019 USD/family .

Main results: Each project covers 3-10 households. The described technologies allows saving up to 4,873.5 l per year – equaling to 10.7 ton reduction of carbon dioxide emissions annually. For 25 years of operation (equipment service life) it could decrease the emission up to 267.5 tons.



Solar-powered motor-pumped well system: 1 - water source, 2 - main water pump, 3- solar power system, 4-control system, 5-upstream piping, 6 -reservoir, 7- secondary water pump), 8- downstream piping, and 9 - water tanker

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China case study: application of a novel type of infiltration gallery for centralized water supply in farming areas—Minhe County of Qinghai Province (with support of China IWHR and Qinghai Institute of Water Resources)

Location: Minhe County of Haidong in the east of Qinghai Province, China.

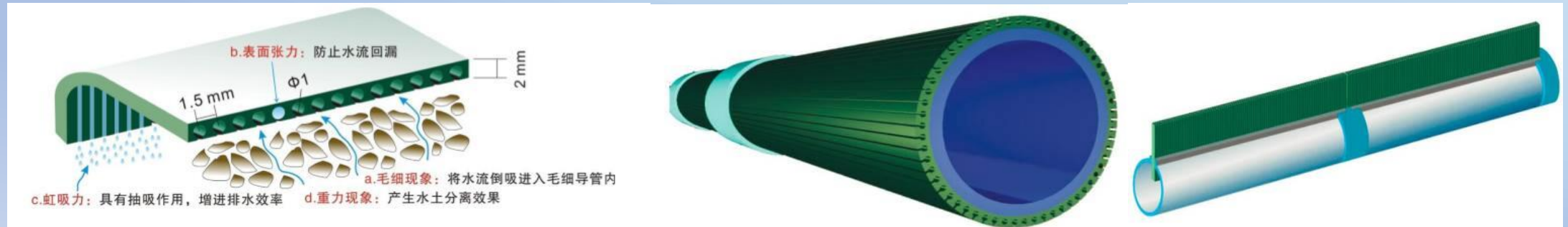
Main challenges: The piping and reservoirs of the old system were all in poor condition. Due to the often pollution of the water source with animal feces, the number of microorganisms in the water was routinely over the permissible level.

Main goal: establish water supply for three villages (Jiefang, Zangan, and Guangming) with a total of 3,819 residents with the total water supply of 381.9 m3 per day.

Main approach: installation of the new novel infiltration gallery with a new capillary percolation band (2mm thickness) to replace the PVC pipes, and concrete and steel tubes. The new design of infiltration gallery is simple, efficient, and easy to maintain. The project is based on the participatory approaches.

Financial aspects: Total amount of the project was USD280,500 (approx. USD0.87 per capita). The system's annual O&M cost is USD9,450 (salaries - USD5,400 per year, dosage - USD1,800 per year, piping maintenance - USD2,250 per year). The water fee roughly covers the costs.

Main results: 634 households received the safe drinking water and overall social stability and economic growth are enhanced



China case study: application of PPP in rural water supply projects

Location: Rucheng County, Hunan Province, China

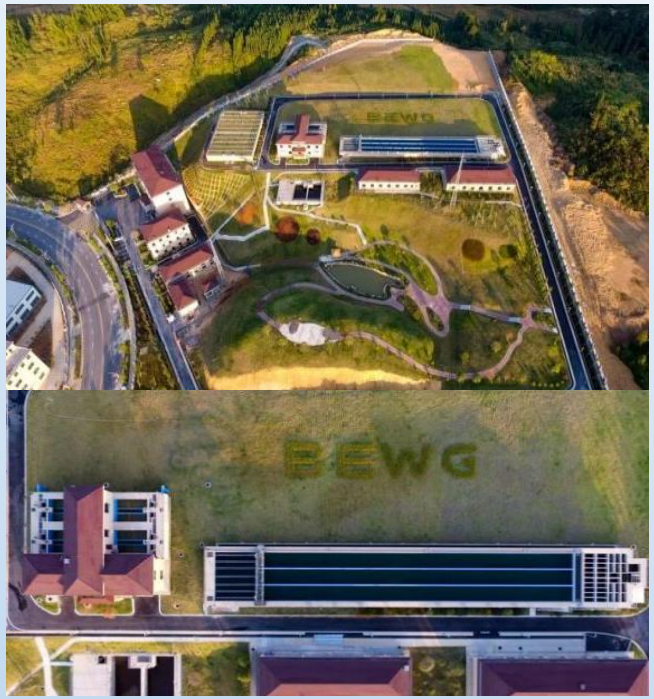
Main challenges: Rucheng County includes 14 townships with a total population of 4.08 million people, including 0.34 million in rural localities with dispersed rural populations. The systems has high construction and maintenance costs requirements.

Main goal: Establishing an effective financing mechanism in the rural settlements of Rucheng County, Hunan Province, through the introduction of PPP schemes.

Main approach: Rucheng County made a consistent and continued effort to apply the PPP model to urban and rural water supply and drainage projects, including a USD0.17 billion province-level PPP demo project (2015-2017). After the construction, private enterprises can generate profit under franchise, charging a usage fee and acquiring government subsidies.

Financial aspects: According to the Guideline on Contracts of PPP Projects, an SPV (special purpose vehicle) can be established by non-governmental capital or jointly by the government and non-governmental capital. In 2012, the government of Rucheng County set up the Rucheng Water Investment Group Ltd and invested USD7.65 million in it. In 2015 an SPV was set up by the government and the union of BEWG and Hunan Second Engineering Ltd with a total investment budget of USD1.66 billion.

Main results: 0.22 million rural residents of Rucheng County gained access to safe drinking water. The newly built Rucheng Second Tap Water Plant serves for 285,000 people (130,000 urban and 155,000 rural residents living nearby).



Rucheng Second Tap Water Plant built under this PPP project

Mongolia case study: School WASH in rural Mongolia (with the financial and other support of ACF, UNICEF, ADB and Australian Aid)

Location: School WASH projects were implemented in 17 aimags of Mongolia

Main challenges: insufficient water supply in schools, unsafe and unhygienic latrines (based on 2007 survey of school dormitory conditions).

Main goal: Address the issues in schools and kindergartens without piped water supply and improve WASH in schools of Ulaanbaatar City and rural areas of Mongolia.

Main approach: Three-steps approach (started in 2014):

Step 1. Identifying the Schools with needs in WASH improvements and potential financing sources.

Step 2. Construction and reconstruction works

Step 3. Establishing O&M mechanisms

School management committees are responsible for day-to-day management of WASH facilities.

Financial aspects: Financial support was provided by international development partners (ACF, UNICEF, KOICA, ADB), state budget and private sector (Mobicom LLC).

Main results: In total of 65,200 children in 105 schools and kindergartens in 101 *Soums* of 17 *Aimags* received access to improved WASH facilities during 2014-2020.

Mongolia case study: WASH in rural Mongolia

(with the financial support of ADB)

Location: Umnugovi, Dornogovi, Arkhangai, and Uvurkhangai aimags are located in southern Mongolia and include the Central Region. Arkhangai and Uvurkhangai Aimags are located in central Mongolia and include Khangai Region.

Main challenges: out of 334 soums only 20 had centralized water supply systems in their central parts and 34 soums did not have drinking water sources. The separated locations of rural soums and the long distances between them make it impossible to provide centralized systems.

Main goal: to support the provision of infrastructure and service improvements in urban areas in Southeast Gobi of Mongolia.

Main approach: 24-hour operational automatic (smart) water supply wells or kiosks were constructed. QR code, QPay, and MonPay systems were used to pay for water, hot water, and wastewater fees. In addition, this smart technology provides water consumption monitoring.

Financial aspects: ABD financed USD15 million (10-20% paid by households, 20-30% from the local budget, 50% from ADB). The piped water connection fee to the central water and sewerage system was calculated at approx. USD340 (one-time payment per household).

Main results: Almost 95% of ger area dwellers in the project soums received access to drinking water within 300 meters of their dwellings. A total of 39.4km of water supply piping and 35.9km of sewerage piping were installed. Nine water kiosks were constructed and are currently in operation.

Tajikistan case study: Human rights based approach (HRBA) to water governance – from unbundling systemic underperformance towards financial sustainability (SDC-funded projects: TajWSS, RRWSSP, RWSSP FV, SDWSMP)

Location: 45 villages (around 125,000 rural residents) in 13 districts across all regions of Tajikistan

Main challenges: Tariffs for drinking water are critically low, for most systems it is at least 3-4 times less than full-cost recovery.

Main goal: To demonstrate the influence of the Human Rights Based Approach (HRBA) application on achieving full-cost recovery tariffs and improvements in fee collection rates.

Two-steps approach:

1. Development of an improved tariff policy along with pilot implementation actions
2. Assisting in the development and application of good governance and consumer rights protection mechanisms, promote adequate consumer behavior, and introduce feedback mechanisms.

Financial aspects: Supply organizations are supported to: (a) determine their full-cost recovery tariff schemes, (b) develop a strategy for consecutive moderate tariff improvements, and (c) implement rights-based approaches aiding improved fee collection.

Main results: 12 WASH schemes are established in Khatlon and DRD Regions (supported by Oxfam and UNDP), and 25 more schemes are replicated in other regions of Tajikistan (supported by ISW, MSDSP, and IFAD).

Uzbekistan case study: Water supply and sanitation practices (Supported by the Swiss Agency for Development and Cooperation (SDC) projects)

Location: Villages in Okhunbabayev, Rishton, Pakhtabad, Makhamat, and Ulugnor Districts of Ferghana and Andijan Provinces, Uzbekistan.

Main challenges: Deficit of drinking water supply (15-20 l/capita/day before getting yard/house connections).

Main goal: Increase access to water supply and sanitation services in villages of Uzbekistan

Main approach: Setting up village own water supply system management, established the Drinking Water Organizations (DWOs) for O&M of water supply system, and organization of wide information campaigns for villagers on hygiene.

Financial aspects: A full cost-covering tariff was calculated as 0.40 USD per m3, which is high for water supply service only, but up to 35 times cheaper than water delivered by truck vendors.

Main results: 15,000 rural residents are provided with water distribution system corresponding to WHO standards

Uzbekistan case study: construction of drinking water supply system in Samarkand Kupaki Community (Mahalla) and in Ferghana Gulistan Community (Supported by UNDP)

Location: Kupaki Mahalla, Samarkand Region, and Gulistan Mahalla, Ferghana Region, Uzbekistan.

Main challenges: Households had lived without access to drinking water supply for many years and were forced to build deep wells to get to water of extremely poor quality. 80% of disease incidence was caused by low water quality.

Main goal: infrastructure development of water supply systems for two target villages and transferring it to the balance of the managing companies.

Main approach: The rural populations were involved in decision-making about improving access to drinking water. The operation of the system was handed over to the regional drinking water management organization ('suv-oqava').

Financial aspects: The total construction cost of the drinking water system for the Kupaki Mahalla is amounted to USD75,000 and USD30,000 for the Gulistan Mahalla. The tariff - USD0.3 - USD0.35 per m3 of water from the pipe. State support programs are available for the population who are unable to pay.

Main results: The Kupaki Village -access to water for the 2,300 residents, school (450 students), kindergarten (120 children), and rural medical center. The Gulistan village - access to the water over 4,500 residents.

Main recommendations

- Identification of **optimal systems of the WASH governance and management** and strengthening the institutional structures is needed;
- Development of **long-term strategies/plans/schemes** and dividing country into the different **WASH zones** according to (i) suitable water sources, and (ii) sanitation systems and (iii) geographic conditions of the settlements;
- Establishment of **intersectoral and interdepartmental platforms** should become the basis for more effective and transparent decision-making and management of WASH related projects;
- Development of **WASH financial plans** identifying potential funding and introducing **nation-wide pro-poor full-cost recovery mechanisms**, special emphasis should be laid on supporting vulnerable communities;
- Development of **regulations and rules**, as well as forging mechanisms allowing easy access to subsidies and tax incentives especially for rural areas;
- **Role and rights of the private sector** players in WASH have to be clearly outlined in legal documents;
- Countries need to pay more attention to **constant coordination between different sectors** (NEXUS approach), using water for dual or multi-purpose systems and to identify benefits for each sector;
- Development of **regular capacity building programs**, staff planning for WASH schemes should be a priority for the governments. **Awareness campaigns** and promoted innovations should bring benefits to vulnerable population
- Establishing **regional knowledge and experience exchange** centers.

Recommendations to next steps

- **Legal support:** Identifying legislation lacunae at national level and supporting countries in drafting laws, by-laws and other legal tools for improving access to WASH;
- **Scientific support:** Supporting countries in establishment of scientific centers aimed at the development, adaptation and promotion of technologies, know-how and best practices for introduction of the WASH systems (Regional knowledge hub on WASH);
- **Capacity support:** Assisting countries in designing permanent capacity-building and re-training programs for specialists and technical staff involved in managing and operating of WASH systems;
- **Knowledge and experience exchange:** Helping countries in molding a platform for exchanging experiences, knowledge and lessons learnt, as well as for detecting the required technical, management and operation knowledge;
- **Financial support:** Assisting countries in development and testing of innovative financial mechanisms to sustain WASH services as well as to involve private sector to operation and maintaining of WASH systems.

Thank you!

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