Assessment of Program Opportunities for USAID in the Tajikistan Water Supply & Sanitation Sector

Report to USAID/Central Asian Republics (Almaty)

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Executive Summary

ES.1 Objective

As part of the Environmental Health IQC, USAID requested that CDM summarize the current situation regarding water, hygiene, and sanitation and evaluate and propose concepts for a five-year USAID water and sanitation program in the likely range of $2.5 to $10 million.

To accomplish these objectives, a Team composed of sector specialists with extensive experience in the region spent about two weeks in Tajikistan conducting field visits, meeting with donors and government officials, and reviewing studies and reports from previous water and sanitation projects. These visits took place in Dushanbe, Khujand and towns and villages in the surrounding areas of those two major cities.

ES.2 Existing Conditions

Review of past studies, talks with Government water and sanitation sector organization officials, and discussions with donors and other international organizations draw a bleak picture of conditions in the sector. Many of the small piped networks operated by collective farms in the Soviet era that supplied water to most of rural Tajikistan (three quarters of its 7.1 million population) are now defunct or in severe disrepair. Many villagers (over 40%[1]) must now carry water from unimproved surface sources and store it at their homes. The situation in major cities and towns is not much better. While most of their piped water supply systems continue to operate, none are yet generating sufficient revenues to sustain operations and services continue to degrade in all but a few cities, most notably Khujand.

As for sanitation, almost 90% of households[2] are served by individual latrines or other basic improved facilities. However, in cities, sewage collection systems are failing and most all wastewater treatment facilities have ceased to operate.

ES.3 Recommended Program Concept

While the original scope of work anticipated two funding scenarios (LOP $2.5 to $5 million, and LOP $5 to $10 million), the Team does not view these two relatively similar ranges of funding, and overall period of five years, as being an important influence on the type of program that they recommend. Instead, the Team recommends that the program simply be scaled up or down in response to the level of funding available. Furthermore, given the high levels of basic sanitation coverage and the severe health risks from the lamentable water supply situation, the Team recommends that the program focuses on expanding improved rural water supply access and improving household water quality rather than sanitation.

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[1] World Health Organization and United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation (JMP). Progress on Drinking Water and Sanitation: Special Focus on Sanitation. UNICEF, New York and WHO, Geneva, 2008.
[2] Ibid.

ES.3.1 Sustainability

The Team strongly believes that the program should incorporate a significant focus on building sustainability. Sector experts have highlighted the failure of many or most donor-supported rural water improvements in recent years to be sustained over time. To be sustainable, village water supply systems must be able to generate sufficient revenue to pay for their operating costs and be operated my institutions that can collect this revenue and operate and maintain the systems. To foster this goal the Team proposes that the USAID program: introduce an element of competition for improvement funds among candidate villages to foster community ownership and engagement; have the program implementer balance consumer "willingness-to-pay" with the costs of maintaining and operating proposed services improvements; and, include a strong focus on system operator institutional capacity building throughout the program's lifetime and build donor and government support for on-going support to these local institutions. Meanwhile, to sustain household water quality improvement, the program should focus on promoting a commercially viable product that allows households to affordably treat water obtained and or stored in an unsafe manner.

ES.3.2 Program Elements

Based on the assessment of the overall status of the sector, other donor initiatives, and the existing USAID assistance portfolio and strategy in Tajikistan, the Team recommends inclusion of two program elements for consideration by the Mission—**Element 1**: Providing Sustainable Water Supply; and **Element 2**: Improving Household Water Quality Treatment Options.

ES.4 Element 1: Providing Sustainable Water Supply

Villages selected to compete for improvement support should be two to three times the number of those to be selected, to foster a strong element of competition. The actual number will depend on (1) progress in implementing the preparatory work, and (2) the amount that USAID is willing to commit in any given year. The initial villages should be those with reasonable access to water, preferably high quality water from a borehole.

Supported water systems improvements should be designed to be simple and have low maintenance costs, e.g. a groundwater well with electric pump connected to a gravity-fed small-diameter pipe distribution system with access via shared stand-posts. Systems should also aim to serve any school, community center or market in the village.

The implementing partner should be responsible for the design of sturdy, replicable system components, supervision of construction and start-up of the system, and training of a community operator. In addition, partner will assist the village in electing a board to provide overall supervision of the system, develop guidelines and procedures for the duties of these officials, including methods of charging for the water and collecting, maintaining and spending those funds for village water

purposes. The partner should also be required to develop procedures and guidelines for both the technical and administrative/financial aspects of the village water system, and train the villagers selected. Given these multifaceted responsibilities, the partner selected to implement activities under this element should have capabilities in the engineering aspects of water supply design and construction, and in community mobilization, and ideally water sector experience in Tajikistan.

ES.5 Element 2: Improving Household Water Quality Treatment Options

While lack of access to a sustainable, improved water supply source is a major barrier to improving public health in Tajikistan, even those areas that have access to piped water in the household may be drinking unsafe water because of contamination during distribution through cracked pipes and storage of drinking water in the home (required because piped sources are intermittent or unreliable). Household water treatment and safe storage interventions can lead to dramatic improvements in drinking water quality and reductions in waterborne disease. As a complement to Element 1, several recommended phases involved in developing and launching a household or point-of-use (POU) water treatment project in Tajikistan include:

- Assessing microbiological and chemical quality of household drinking water to judge the importance and viability of POU treatment and identify the appropriate technology/ies to address identified water quality issues;
- Conducting formative research to evaluate consumer acceptability and potential uptake of these POU water treatment methods, resulting in selection of the product(s) to be launched;
- Assessing the feasibility of and developing next steps for locally manufacturing or importing, promoting, and distributing the product(s); and,
- Developing a comprehensive behavior change strategy to promote correct, consistent, sustained adoption of the treatment option(s) selected.

ES.6 Admission of Risks

It must be recognized that the proposed program is a risky one. Oxfam has reported that almost all of the water supply improvements in 30 villages that it provided over the past several years in Tajikistan have subsequently failed. This program concept relies heavily on local-level institutional strengthening, but, even if successful, complementary support must be provided by higher levels of government to sustain and expand such efforts over the long-term. The risks are great. But failure to try a new way will only admit defeat. The Team believes it is a risk worth taking.

Section 1
Introduction

1.1 Purpose and Objective of this Study

Essentially, the request from USAID to the Team was as follows:

- Obtain information about the work of a selection of the key donor and government agency participants in the Tajikistan water, sanitation[3], health, and hygiene sector. Summarize the current situation regarding water, hygiene, and sanitation.
- Conduct field trips to appropriate sites to gain an adequate understanding of conditions and problems in these sectors.
- Evaluate and propose a concept for a five-year USAID water and sanitation program. The terms of reference suggested the likely range of funding to support such a program would be from $2.5 to $10 million over a five-year period.

The Team understood that their proposed program concept should identify an appropriate scope for USAID support that:

- Presents minimum overlapping with existing donor programs, and
- Has the potential for significant and beneficial impact.

There have been many reports addressing water sector problems in Tajikistan. The Team made a conscious decision to avoid replicating such material and to make this report brief and to the point. The report focuses on addressing two questions:

- What is the general status and condition of the sector today? (focusing particularly on what we saw and heard)
- What can USAID do to make a positive impact by undertaking modest projects with useful reproducible potential?

Two deliverables were required. First, a final Assessment Report to summarize the current situation regarding water, hygiene, and sanitation. Second, a Concept Paper to propose options/opportunities for a five-year USAID water and sanitation program. The concept paper was to present two program design possibilities reflecting two different funding scenarios: (1) a program that receives $500,000 to $1 million per annum, over 5 years (LOP $2.5–$5 million); and, (2) a program that receives $1 million to $2 million per annum for five years (LOP $6–10 million). The two deliverables are combined into this one submission.

[3] Based upon current/high basic sanitation coverage levels, it was agreed that sanitation was a significantly lower priority when compared to water supply.

1.2 Study Team

The study team included Mr. Donald Cullivan, a CDM consultant, as team leader, Mr. Anthony Kolb, USAID/Washington, and Dr. Malika Makhkambaeva, USAID/Dushanbe. Mr. Cullivan is a specialist in the water and wastewater sector and institutional strengthening. Mr. Kolb is also a water and wastewater engineer, and Dr. Makhkambaeva is a medical doctor and specialist in health and hygiene. All have extensive experience in the region. Collectively, these three persons are referred to in this report as the Team.

1.3 How the Study was Conducted

Following briefings in Dushanbe with USAID officials from Almaty (by video conference call) and Dushanbe (in various meetings), the Team undertook an extensive round of visits with donors and government officials November 12–19. These visits took place in Dushanbe, Khujand, and towns and villages in the surrounding areas of those two major cities. A detailed list organizations contacted, places visited, and summaries of the results of those visits, is attached as **Annex A**. During these investigations, the Team met a total of 33 specialists in 11 meetings with donor organizations and five government organizations. A list of donor and government sector organizations is attached as **Annex B**. The Team also undertook three field trips to sector sites outside the two large cities. During the remaining time in Dushanbe, November 20–22, some of the Team members conducted follow up meetings as appropriate, while others worked at writing this report and preparing a power point exhibit for an exit briefing with USAID in Almaty on November 24, 2008. While less than two weeks of field visits is a rather short time, the Team felt that—in addition to the desk reviews the Team conducted of past studies and work in the sector—this level of investigation was sufficient on which to base our findings and recommendations.

Section 2
Previous Studies

A large number of existing studies and programs were implemented in the past, or are currently underway in the country, that relate, in some part, to water and sanitation specifically, and to health and hygiene to a lesser extent. These studies and programs were funded by a wide range of national and international institutions over the past several years. A list of many of these studies and reports is attached as **Annex C**. The Team reviewed many of these reports to obtain background information for this project.

Section 3
Existing Conditions

3.1 Overview

The current population of Tajikistan is estimated at about 7.1 million. There are conflicting reports about the rate of movement of rural people to the urban areas, but most local authorities appear to agree that the current urban/rural division is split about 25/75 percent.

3.2 Urban Water Supply and Sanitation

3.2.1 Overview

"Urban" Tajikistan consists of about 60 communities with the status of city, town or *rayon* (district) centers. All these communities have utilities, called Vodokanals, running piped water systems. However, only about 25 communities have centralized wastewater systems. Most Vodokanals are coordinated by the State Unitary Enterprise (SUE) or "Khojagii manziliyu-kommunali." However, the two largest vodokanals in Dushanbe (population of 680,000) and Khujand (population of 142,000) are not part of SUE but are owned by local government.

While Vodokanals continue to provide piped water supply in these communities there are many problems:

- System expansion has not kept up with population growth, so not all homes have access (WHO/UNICEF estimate that 20% do not have piped water access).
- Water treatment operations are generally very poor. For example, even after years of major donor investments about 30% of Dushanbe's piped supplies are unfiltered surface water. A Ministry of Health informant claimed that there is no consistent chlorination of supplies in *any* city.
- Levels of service are poor with water only available for a few hours each day and/or with frequent interruptions.
- No utilities are yet generating sufficient revenues to sustain operations and services continue to degrade in all but a few cities.

As for sanitation, almost all households (95%)[4] have access to household-level improved basic sanitation facilities. However, even in the 25 communities that have them, centralized sewage collection systems have failed or are failing and most all wastewater treatment facilities have ceased to operate.

[4] Ibid.

Several years of donor support (mainly World Bank and EBRD grants and Swiss government development assistance) is helping to gradually improve the urban water supply situation but to-date only in about 13 cities. Many challenges remain.

To help illustrate the present urban water supply and sanitation situation, we present below a summary of the two utilities that were visited by the Team.

3.2.2 Khujand Utility

The Khujand Water and Wastewater Utility (Vodokanal) represents one of the few recent success stories of the water sector in Tajikistan. The local government-owned Khujand Vodokanal was established in the late 1930s in Tajikistan's second largest city and traditional commercial hub in the Fergana Valley. It functioned reasonably well during the Soviet era, but along with other Tajikistan utilities suffered severe degradation during the internal conflicts following independence. In recent years, however, with funding from several donors (most importantly, EBRD) and strong leadership by their General Director, the utility has made very good progress in improving its internal management and performance and meeting the needs of its customers. Since May 2008, the utility has provided water for 24 hours per day to all of the 180,000 people it serves—the entire city population. As water service has improved, the utility has been able to increase its rates by a factor of about eight and is, reportedly, able to cover operations cost and make a profit. The General Director is keenly aware of the importance of strengthening the institutional capacity of the utility as well as improving its water supply. While the utility has had significant international financial support, it has used these funds wisely. Details on the Khujand Vodokanal story are included in **Annex A**.

The Team did not explore in detail the sanitation/wastewater management situation in Khujand.

3.2.3 Vahdat Utility

The Vahdat Water and Wastewater Utility (Vodokanal) represents a more typical situation in the country. This SUE-owned vodokanal serves only somewhat more than half of its population of 55,000, and provides water for limited periods during the day. Their problems are exacerbated by the fact that the electricity critical for operating its pumps is routinely available only for eight hours per day. The World Bank is currently providing grants of $2.4 million under its Urban Water Supply and Sanitation Program to Vahdat for improvements. These works are still under construction and include several new source wells, and chlorination and pumping equipment. The utility is unable to charge its customers enough to meet current operating costs, which are already inadequate to provide for needed maintenance, let alone expansion or upgrading.

The wastewater management situation is even worse. The utility's secondary wastewater treatment facilities have not been operational since 1995. During the

frequent power outages, untreated wastewater is discharged directly to the river near the city. When power is available, the wastewater is pumped to the site of the defunct treatment plant where it is discharged into shallow dikes beside the river. Officials told the Team that the sewage percolates into the ground but this seems unlikely, as raw sewage tends to clog soil quickly. These conditions almost certainly have lead to discharge of raw sewage to the river, thus presenting a serious risk to the health of those living in downstream communities.

3.3 Rural Water and Sanitation

3.3.1 Overview

While during the latter Soviet period most rural villages had functioning piped water supply systems operated by their collective farm administrators or other authorities, of these piped systems, few are functioning today due to the local administrative vacuum caused by the post-Soviet break-up of these farms and the lack of maintenance and damage during the country's long civil war. As these systems have been abandoned, villagers have become responsible for finding their own water. They find it now from a variety of sources, including shallow wells, streams, and springs, or irrigation canals. During our visits, the Team found it a common sight to see water being carried in plastic containers, whether by hand, push carts, horse-drawn wagons or in small trucks, almost always by women and children.

As for sanitation, households are generally served by individual latrines on the owners' properties. According to WHO/UNICEF estimates, 92% of households have access to such improved basic facilities. Some villages also maintain public latrines in commercial centers.

The Team found it striking to learn from almost all key informants that over a decade of support from a variety of humanitarian organizations and bi- and multi-lateral donors have resulted in little sustained improvement in the rural water supply situation. There were several reasons noted for this failure. The two most prominent are (1) the on-going lack of clear policies and confused governance surrounding the sector, and (2) efforts that too commonly focused on physical infrastructure improvements and neglected building the community buy-in and operator capacity needed to sustain these improvements. Several international donors and implementers have fully recognized these challenges and are working to address them. The Swiss are playing a particularly important leadership role in this sector revitalization effort.

To further illustrate the present rural water supply and sanitation situation and some existing USAID efforts to address the situation, we present below a summary of the situation in areas visited by the Team.

3.3.2 Village of Niyozbek

This village is in the northern part of the country (in Kanibadam Rayon of Sughd Oblast). The Team witnessed an example of villagers attempting to improve their local water systems. With financial and technical support from the USAID-supported, Urban Institute-implemented Local Governance Community Participation Program (LGPC) , Jamawat Sharipov, with a population of 20,000 (which includes Niyozbek village, population 5,000), has appointed a three person "water board" (a woman and two men) to improve water supply to its residents. The Team met and talked with these three officials at the site of a well they hope will serve their people. With LGPC assistance, they have "taken over" (the details of ownership and the relationships with responsible supervising officials is unclear) an abandoned agricultural well and pump station site. The Jamawat water board has constructed a new pump house at this site, installed a new pump and motor, is planning to construct pipelines to carry water to their villages, and have agreed on a fee for service scheme within the community.

3.3.3 Other Villages

In another village in Sughd Oblast where Mercy Corps is initiating a new USAID maternal and child health program, we met children collecting water from a rehabilitated piped system sourced from a distant mountain spring. The water quality appeared to be very good, and it was convenient to the villagers. In other areas, it was common to see young women driving horse drawn carts loaded with large jugs of water, and children carrying 5-gallon plastic containers on home-made push carts.

Mercy Corps has worked has for several years with USAID and other donor support in rural Tajikistan on a number of development efforts including water supply service improvement. Their staff emphasized strongly the need to focus on local community mobilization efforts to ensure sustainability.

3.3.4 Lessons for Future Programs

It was clear, from the example of the efforts at Niyozbek, that local people are willing to organize and work to improve the water supply to their villages. However, the quality of the construction work left much to be desired based upon observations of the team of the new well pump and piping at Nyyozbek. Questions also arise about how they will be able to maintain and operate these facilities over the long term. How will they convince the villagers to pay for these services? How can the funds that are collected be protected and spent wisely, and with what transparency? What will be the attitude of central government authorities who may have the legal authority - and possibly even a mandate – to provide water services to the villages, and yet are not doing so? Where can the villagers turn to for technical assistance beyond their capabilities? These types of questions have to be addressed, and solutions found, so that these laudable start-up efforts can be improved and sustained over time.

3.4 Active Organizations and Donors in Sector

Annex A lists various actors in the water supply and quality sector. A summary of these existing projects is provided below to focus USAID's project design so as to avoid redundancy.

- **World Bank**: The Bank is one of the main sponsors of efforts to improve water supply and sanitation in urban areas. Besides their on-going grant support for improvements of the Dushanbe Vodokanal, they currently support a $15 million grant program for11 cities in the 20,000 to 50,000 population range (Vahdat as described above being one). The project has two primary components and is implemented by a project implementation office housed under the State Unitary Enterprise:

  1. Physical improvements (pipeline replacement, furnishing vehicles and equipment, leak detection and repair).

  2. Institutional strengthening of the vodokanals in each city.

- **UNICEF** has acted as Water, Sanitation and Hygiene Sector Lead for a number of years in Tajikistan. In this role, they have periodically convened government, donors and international humanitarian organizations working in the sector and conducted evaluations of the sector. However, they have not played a particularly key role of late. Their field activities in the sector (hygiene promotion, and latrine construction in schools) are only a sub-component of their education program. They have no staff dedicated exclusively to working in the sector.

- **USAID** has supported many water and sanitation activities as part of its humanitarian assistance in recent years. Currently, the primary project contributing to increased access to improved water supply is the Local Governance Community Participation Program (LGPC). The Urban Institute is currently implementing this project that provides training and technical assistance, and funds (using small grants of $20,000 or less) basic water supply systems in rural areas. The work in Niyozbek Village described above is on example. The project also helps improve solid waste management in both cities and towns. Urban Institute performs hydraulic modeling of distribution systems and uses modern leak detection equipment to identify leaks and focus repairs in village water systems.

- **Swiss Agency for Development & Cooperation (SDC)** is taking a lead role in support to the water supply sector. The focus of their current efforts include:

  1. Promoting policy dialog with the Ministries of Land Reclamation and Water Resources, Housing and Reconstruction and others, with the goal of leading to sector-wide reforms;

2. Addressing ministerial reform;

3. Encouraging networking of relevant organizations, including relevant past experience, community tasks and responsibilities, and problems of poor materials; and

4. Piloting a model to sustainably expanding piped water access in rural areas that includes setting up a District Trust Fund. This effort includes an on-going project (started last year) in rural Sughd Oblast rehabilitating a defunct water system and building new ones.

- **Oxfam**: Oxfam's WASH sector strategy is to (1) gather information, (2) continue their fieldwork in Katlon Oblast on water supply and sanitation, and (3) advocate for sector policy reform. They are widely recognized as one of the international humanitarian organizations that has made consistent and high-quality contributions to the sector in Tajikistan. The Team had the impression that the contributions of other international organizations have been less consistent and influential at the national level.

Section 4
Recommended Program Design

4.1 Funding Scenarios

USAID requested two project design possibilities reflecting two different funding scenarios: (1) a project that receives $500,000 to $1 million per annum, over 5 years (LOP $2.5 to $5 million); and, (2) a project that receives $1 million to $2 million per annum for 5 years (LOP $6-10 million). While the original scope of work anticipated these two funding scenarios, the Team did not view these two relatively similar ranges of funding, and overall period of 5 years, as being an important influence on the type of project design that they would recommend. Instead, the Team agreed that the project design they recommended would simply be scaled up or down in response to the level of funding available.

4.2 Two Program Design Elements

Regardless of the funding scenario, and based on the relatively good overall access to basic sanitation in Tajikistan contrasted with the extremely dire water supply situation, the Team recommends the USAID program focus on improving water supply rather than sanitation.[5] This decision was also approved by USAID.

Based on their assessment of the overall status of the sector, other donor initiatives, and the existing USAID assistance portfolio and strategy in Tajikistan, the Team recommends inclusion of two program elements for consideration by the Mission.

The first program element targets improving access to sufficient quantities of water for household use on a sustainable basis—sustainable beyond the many short-lived interventions sponsored by donors in Tajikistan's post-conflict period. This element would directly contribute toward helping Tajikistan to attain its Millennium Development Goals for improved water supply, as they are currently defined.

The second program element focuses on improving individual household's ability to treat and store water in the home to ensure it is safe for drinking, especially for the most vulnerable members of the household—children. This point of use (POU) water treatment element would promote a set of interventions that have proven health efficacy.

The nature of the two complementary concepts is different in the sense that there would be direct "countable" beneficiaries from the capital improvements in water supply (Element 1). The cost capital improvement could vary widely for different communities depending on the cost of accessing and treating available water sources, the condition of current infrastructure, the physical layout of villages the type of

[5] Available survey data, the Team's field observations, and experience in the region suggest that access to basic sanitation (as defined by UNICEF and WHO) is extensive throughout Central Asia and in Tajikistan. This relative, qualitative assessment compares Tajikistan to South Asia and most of Sub-Saharan Africa where open defecation is widespread. Meanwhile, this contrasts sharply with the widespread consumption of water from unimproved sources in Tajikistan.

water improvements that the community is willing to pay for etc. Only after the program implementer determines these parameters for the communities selected, will USAID have fully informed cost estimate and program targets. Increasing program resources could fund more expensive capital improvements for a particular set of communities or more modest capital expenses for additional communities.

By contrast, the water quality concept (Element 2) relies on a social marketing and behavior change strategy that would use increasing levels of funding to "target" increasingly large populations. However, regardless of the level of USAID investment, it is difficult to predict a-priori the actual number of people that will adopt and thus benefit from the commercial products that are proposed for promotion. The scale impact will depend on the program's success in identifying and convincingly promoting the point of use water treatment product(s).

4.3 Project Element I - Providing Sustainable Water Supply

4.3.1 Selection of Target Villages

Selecting villages as the targets of USAID's water supply improvement program, as opposed to cities, provides considerable flexibility to accommodate the suggested funding range. The Team proposes the selection of villages for participation in the study, perhaps several of which may constitute a Jamawat, or cluster of villages, from two sections of the country. An early decision should be made on whether to include only Jamawat groups of villages or single villages, or a mixture. Some villages should be in the vicinity of Khujand, and others in the vicinity of Dushanbe.[6] While this approach will not address the needs in far reaching portions of the country, it will facilitate management and oversight of the pilot program within a reasonable range of these two major cities to permit supervision of construction and careful monitoring of progress, which could then be expanded (scaled up) to a broader geography should USAID wish to extend the program. The principal criteria for selection of villages should include:

- Bottom up demand/need from the village;
- Willingness to follow the mandates of (a) the USAID and (b) the government, associated with rural water/sanitation intervention (such as in kind services or cash up-front);
- Solid local leadership;
- Demonstration of strong interest and buy-in;

[6] Villages observed near these two large cities are very basic, and are unlikely to be significantly different from those located in more remote regions.

- Demonstration of the ability to maintain the system, normally shown through initial leadership and in-kind services, in the long run;
- Reasonable access to acceptable source of water; and
- No significant physical/technical constraints affecting constructability (rocky subterranean conditions, access rights, land availability, etc.).

To the extent possible, every effort should be made to minimize external influences in village selection.

4.3.2 Basic Facilities Proposed for the Villages

Each selected village (alone or in Jamawat groups) should be supported in establishing an improved water source for its population. The implementing partner will be responsible for helping the community identify the particular type of source improvement(s) established. Feasible/affordable technical options should be presented and preferences of the community gauged before designs are completed. At a minimum, selected options should meet the definition of "improved water source" as defined by USAID in the Foreign Assistance Framework guidance – general standards the closely match the WHO/UNICEF Joint Monitoring Program definition.

An acceptable source improvement could be installation of wells and associated hand pumps. However, government support for this technology is lacking and it may not be widely acceptable in many communities previously accustomed to using piped water systems. As such, capital improvements would likely predominantly involve drilling or rehabilitating a deep groundwater well and installing an extraction pump *or* piping in water from an elevated protected spring nearby the communities—preferred sources that should limit the need for costly and technically difficult chlorination. , Then improvements would be constructed to bring these safe sources of water to the community by establishing or rehabilitating a rudimentary piped distribution system with either individual household and/or public stand pipes within 200 meters of all households. The implementing partner should also consider providing limited storage in the distribution system. Such storage capacity would help these systems cope with the frequent electrical power outages that undermine systems totally reliant electric pumps to ensure distribution. It has been assumed that few if any villages will be able to obtain a water supply without some form of pumping. Systems should be designed to minimize pumping requirements and thus minimize operating costs and maximize the robustness of systems to power failures.

The implementing partner should prepare standardized designs and specifications to be used for all components to ensure acceptable and uniform quality of the works to be installed.

4.3.3 Consideration of Conducting "Willingness to Pay" Studies

Some have expressed skepticism that villagers will pay very much, if anything, for the type of water systems described above. The concern is that villagers are so poor that they will walk long distances for water, or collect water from polluted canals, rather than pay for water delivered to a point within short walking distance from their home. That has not been the experience of some members of the Team. In fact, in seriously water-deficient areas, people have been known to pay ten times, or often far more, per cubic meter, for water purchased from a tanker truck, than is charged for people in cities with piped water supplies. Well-designed "Willingness-to-Pay" studies can be helpful in obtaining advance information about whether a particular community is willing to pay enough to cover operating costs to obtain good quality water at reasonable distances, on a sustainable basis. The Team suggests that at least two such studies be conducted in candidate communities at an early stage of the program.

4.3.4 Element Staging

USAID has proposed a 5-year program, with funding to be approximately equal over that period, but that does not appear to be a fixed condition. The early costs of the program will relate to its design and establishment of procedures by the implementing partner selected for that purpose. Once those are established, specific village projects can be constructed over the length of the project period. USAID would advise the implementing partner on suggested levels of expenditure on an annual basis. If USAID is satisfied with progress, and the results so warrant, USAID might consider increasing the rates of expenditure in future years. The nature of the program will involve relatively substantial costs for its preparation, execution and monitoring, while the capital costs for facilities will be relatively low, because of the simplicity of the works being constructed. Therefore, USAID should not be surprised to see much higher design/implementation costs relative to construction costs than would be expected for more traditional types of programs.

4.3.5 Element Implementation – Stage 1

It is clear from the description of the suggested approach that some staging will be required. In Stage 1, a competent and experienced implementing partner will have to be engaged to execute the program. Selection must follow USAID procurement regulations, but it would be preferable to prepare a short list of capable candidates from among those presently active in the country (or a design team that includes local knowledge and capabilities). The implementing partner preferably should have experience in Tajikistan, and specifically, should have capabilities that embrace both technical and community development skills.

The tasks of the implementing partner would include the preparation of typical designs and making cost estimates of the various types of facilities required, for a range of village sizes. The villages/communities themselves should be engaged in

the design process to enhance their sense of ownership and understanding of the associated costs which may increase their willingness to pay.

If approved by USAID and included in the terms of reference, willingness-to-pay studies should be conducted at two selected villages. Once this information is available, the implementing partner should prepare a brief report to USAID indicating a selection of program activities that span the range of budget levels set by USAID for that particular period. That report should also suggest a number of possible villages/*jamoats* in the two general project areas that exceeds the budget limits. The reason for this is to encourage villages to compete for these improvements by indicating, in ways to be determined by the implementing partner, whether and in what detail they have obtained the agreement of a majority of homeowners to pay for these services. The implementing partner's community development specialists should develop a program for how this is to be done. In general, the criteria (or indicators) for acceptance should include:

(1) An agreement to establish a 3 to 5 person "Village Water Board" that should include at least one woman on a 3-person board, and two women on a 5-person board. Service should be voluntary, and the implementing partner should provide job descriptions that define their powers, duties and responsibilities. The implementing partner should suggest lengths of terms of service for board members, which might be for 3 years, staggered so that some members will have continuity as new members are added.

(2) Evidence of the results of a meeting held among the villagers that indicates that there is a consensus about willingness to pay at least (the amount or range should be determined by the implementing partner) per month for this service, and that agreed-upon types of persons should be exempt from payment. (Widows, or such other categories as may be agreed upon, but not to exceed 10% of all households.) Villagers must also be informed that they will be responsible for possible future fee increases should it be necessary to maintain the service at acceptable levels. The rates should be set at levels needed to pay basic operating costs. These include electricity for pumps, periodic maintenance of the pump and motor (possibly by technicians with the necessary skills at the Rayon level), repairs to any damage caused to standpipes or other facilities, and any other maintenance needed to ensure that the system continues to perform in a satisfactory manner.

(3) The implementing partner should provide a system for collection of and controlling and depositing the fees collected for services, and should establish secure systems for controlling the expenditure of these funds and record keeping. These should be written out as rules and regulations of their village/Jamawat water system. The villager families who will receive the benefits of the new water system must agree in writing that they will adopt and

follow these procedures. The implementing partner also should suggest procedures for occasional independent audits of these accounts.

(4) The villagers also should agree that they will abide by rules and practices to be developed by the implementing partner to insure order when obtaining water and to respect and protect the facilities that have been installed to serve them, or such other matters as the implementing partner may consider appropriate.

The implementing partner should evaluate the responses from the villages/*jamoats* and suggest a list of those most qualified to become recipients of assistance from the program. An effort should be made to balance the populations of proposed candidate villages between the two project areas. These recommendations should be submitted to USAID, who will make the final decision on which villages are to be selected for participation in the program.

4.3.6 Element Implementation – Stage 2

Once USAID has made its selections, the implementing partner should select a team of engineers to implement project designs, selection of and agreements with contractors, and supervision of construction at both regional sites. The implementing partner should also select teams of community development specialists for both regions. These personnel should be those named in the proposal to USAID in competition for the assignment. The implementing partner may either nominate their own personnel for these functions, or propose the involvement of personnel from other firms as sub-contractors to the implementing partner. In any event, the implementing partner shall have overall responsibility for the execution of the project.

Implementation should proceed in both directions. The engineer's work should proceed immediately, with the objective of preparing plans and selecting contractors within about four-to-six months. During that period, the implementing partner's community specialists should facilitate the selection of village water board members, who will draft rules and procedures for the use and payment of the completed services. Periodic visits to the selected villages should be made by the community specialists to confirm the rate of progress in constructing the facilities, and to ensure that they are taking the required actions in terms of meeting their commitments on establishing members of the Village Water Board, and appropriate procedures for the collection, maintenance and disbursement of funds.

4.3.7 Element Monitoring

The recommended program will cover diverse communities and extend over a five-year period. This will place a burden on USAID for program monitoring. The Team suggests that the implementing partner develop a comprehensive (but concise) system for keeping USAID informed monthly on progress (or lack of it) at each of the program sites. Obviously, this system should include details of expenditures,

physical progress made, relevant photographs of activities, a description of actual and potential problems and proposed plans of actions to ameliorate them.

4.3.8 Element Implementation – Future Stages

As the implementing partner's work progresses, USAID would have the option—as funds permit and as the implementing partner's performance warrants—to direct the implementing partner to expand this work into other villages, as suggested by the implementing partner and approved by USAID.

4.4 Project Element II - Improving Household Water Quality Treatment Options

While lack of access to a sustainable, improved water supply source is a major barrier to improving public health in Tajikistan, even those areas that have access to piped water in the household may be drinking unsafe water because of contamination during distribution through cracked pipes and storage of drinking water in the home (required because piped sources are intermittent or unreliable). For example, after years of major donor investments, inadequate treatment and the poor condition of the distribution system in Dushanbe are delivering visibly unpalatable water to about a third of the population. Meanwhile, there is little donor support or government emphasis to systematically address this domestic water quality problem or that associated with the millions that will continue to rely on unsafe surface water sources for drinking in the coming years.

Household water treatment and safe storage interventions can lead to dramatic improvements in drinking water quality and reductions in waterborne disease—making an immediate difference to the lives of those who rely on unsafe water sources—especially among children under five and among immuno-compromised individuals. A variety of physical and chemical treatment methods to improve the microbial quality of water are available and many have been tested and proven effective to varying extents in developed and developing countries. As such several donors, including USAID and UNICEF, have made promotion of such household water treatment methods a priority intervention for child survival. Currently the most well vetted treatment methods include chlorine-based household water treatment products (these include chlorine based Safe Water Solutions [SWS], chlorine tablets, and Proctor & Gambles' chlorine-flocculant powder [PUR]), solar disinfection (commonly promoted under the name "SODIS"), and several filtration technologies (prominent affordable technologies include bio-sand filters and ceramic filters).

In Tajikistan, there does not appear to be any widely available, affordable water treatment product. While chlorine-based products have been used by NGOs and government in response to disease outbreaks, boiling is the only significantly common form of water treatment that households report using. Making an alternative product or products available could play an important part in the wider

efforts to break the cycle of contaminated water, diarrheal disease, and child mortality from diarrheal disease.

4.4.1 Element Phases

There would be several recommended phases involved in developing and launching a household or point-of-use (POU) water treatment project in Tajikistan.

A. Water Quality Data

While point-of-use treatment may be an effective complement to an existing water supply situation to ensure that consumed water is potable, an assessment of the typical microbiological and chemical quality of household drinking water is required to judge the importance and viability of such an investment.

The Republican State Epidemiological Service is responsible for water quality testing of potable water in Tajikistan. However, their capacity for conducting such monitoring is severely limited because of a lack of equipment and funding to support sample collection and analysis. There have been several recent donor-sponsored efforts to fill the resulting information gap on the water quality situation in Tajikistan. The largest and most systematic was a 2005 WHO/UNICEF sponsored water quality study. However, even this study provides a very incomplete picture of the sources and biological and chemical properties of the water currently consumed by the population.

In addition to reviewing the limited available water quality research and relevant data on any past efforts to promote POU water treatment in Tajikistan, the USAID implementing partner should be tasked with conducting primary data collection and analysis of household water samples. The synthesis of the resulting information should also include any relevant on-going programs and interventions and potential partners. Results will either show which household water sources are safe, or those that some additional treatment is required. It will also identify candidate technology/ies to address identified water quality issues.

The goal of a POU initiative is correct, consistent and sustained use of household water treatment, so that risk of exposure to contaminated water is reduced. Methods that may have only seasonal application in Tajikistan, for example solar disinfection and bio-sand filtration, which are climate or temperature dependent, are probably not appropriate for this setting. However, chlorine-based methods and filtration with disinfection should be explored. Since typically consumers prefer a range of choices of products and methods, the plan may be to launch multiple products, possibly in a phased timeframe.

B. Formative Research

Once the need for and the range of appropriate technologies has been established, additional research to evaluate consumer acceptability and potential uptake of these

POU water treatment methods should be conducted. This study should explore issues related to the water treatment products at the point-of-use, including product acceptability, consumer preferences, perceived benefits and disadvantages, barriers to effective use, willingness to pay levels, potential product/service delivery strategies and networks, and any other pertinent behavioral or contextual variables that arise. Both qualitative and quantitative data should be collected as part of the household usage research. This phase will result in selection of the product(s) to be launched.

C. Importation/Manufacture

Depending on the product(s) selected, it will be necessary to assess the feasibility of and map out next steps for locally manufacturing or importing, promoting, and distributing the product(s). Admittedly the current economic and governance situation does not bode well for the prospects of establishing local manufacture of such products. However, there are a variety of similarly priced consumer products, e.g., shampoos, soaps, that are widely available in Tajikistan but not locally manufactured. Especially if the product was supported by and promoted by public health officials, regular importation seems a possibility.

Regardless of these initial impressions by the Team, designing a program to explore and develop these options is a standard approach to ensuring a dependable product supply. This involves identifying the relevant authority/ies involved in approval to import and/or manufacture and nationally market the selected point-of-use water treatment product(s), describing the policy/regulatory environment for point of use water treatment and documentation of process for registration of the selected product(s). Other issues to consider include potential siting of any facilities and a timeline to complete construction. Local manufacturing may provide synergies with USAID/Tajikistan Economic Growth's portfolio to provide financing.

D. Marketing

The lead implementing partner of this project, using information from the initial formative research and other market research, would develop a comprehensive behavior change strategy to promote correct, consistent, sustained adoption of the treatment option(s) selected. This would include training, mass media and interpersonal communication and demonstrations, community mobilization, engaging NGO, governmental, and private sector partners, schools and health care and pharmacy personnel, etc. There would also be some activities required at the policy level to ensure that the enabling environment is conducive to adoption of the promoted option(s).

4.4.2 Element Monitoring

The USAID standard indicator for a project of this type is the "number of liters of water treated approved methods", but customized household survey indicators can be developed to measure sustained, correct use, and improved access through sales data.

4.4.3 Additional Information

USAID/GH has solid experience with programs promoting chlorine-based POU water treatment using liquid chlorine (see 1-page fact sheet on the Safe Water System), PUR combined flocculant/disinfectant sachets (see one-page fact sheet on PUR), and Aquatabs, an effervescent chlorine tablet. In addition, there is now peer-reviewed evidence of the positive health impact of ceramic filters treated with colloidal silver for disinfection, and a comprehensive manual on how to build and operate a high quality colloidal silver ceramic filter manufacturing plant (http://www.rdic.org/waterceramicfiltration.htm). Technical assistance is available either directly from USAID/GH, from CDC through USAID/GH support, or from the NGO and/or private sector, for all of these product options.

4.5 Some Considerations of Project Design Elements

The Team would like to suggest that the Mission consider the following pros and cons in consideration of the two project design elements being proposed.

Element	Pros	Cons
Providing Sustainable Water Supply	• Overall development impact could be very substantial and would address the most commonly self-expressed community development priority in Tajikistan • An important precursor to facilitating further improvements in sanitation and hygiene • Strong existing USAID implementing partner capacity among LGCP	• Institutional minefield as the policy environment is still in flux • May not be able to identify sufficient number of willing communities • Even with an overall budget of $10 million the reach of the intervention would be limited[1]
Improving Household Water Quality Treatment Options	• Well established Mission relations with MOH/SES – the relevant government focal point • Potential for quick health impact • Fills a current donor gap • Could build disease outbreak response capacity	• Unclear level of demand – as such sustainability uncertain • Problematic private sector environment – as such scalability uncertain • Likely would require a new USAID implementing partner

Notes:
[1] 75% of the total population is rural, translating to over 5 million people to be served, If simple service of the type proposed in this report is provided, even with an approximate per capita cost of $50, a $10 million-expenditure would only serve about 200,000 people. This represents only 4% of the rural population.

Annex A
Players in the Water Supply & Sanitation Arena

The International Community

Water Users Association Support Program (WUASP) This group is supported by USAID and the WinRock Foundation. The mandate of the WUASP program is limited to assistance in strengthening irrigation systems, but practically every village involved has requested their assistance in improving their municipal water supply systems as well. They are now providing assistance to irrigation systems in some 30 locations, about half of them near Dushanbe and the rest in the south. Most use water from the Amu Daria River. Their budget is $1.4 million for all 30 systems. Another three to five locations are under planning. Much of their efforts function under the "Water Users Association Law", passed a few years ago. The basic law was adapted from a similar law in Kyrgyzstan, but some parts are indefinite, leading to problems. There is essentially no rain from April through October, making water management difficult. There are about 1,300 farms within these associations, and about 250,000 people receive benefits from their operations.

World Health Organization (WHO) The basic WHO mission is to improve the health of the people in Tajikistan, which is presently poor, and no significant improvement is likely in the short term. The weak laboratory systems tend to undercount the severity of the health conditions. WHO considers that the Ministry of Land Reclamation & Water Resources is a target for improvement. The government tends to follow the 1982 Soviet law on drinking water standards, rather than the WHO standards. The Ministry of Health's Sanitary Epidemiological Service used to be responsible for water quality testing, but under current conditions, labs are poorly equipped and staffed, and the regulatory system is broken. Chlorine gas is expensive, is in short supply, has to be imported, and is not used in adequate amounts. The same is generally true of other chemicals normally used in water treatment. The system of epidemiological reporting is currently significantly under-reporting the incidences of diseases. The hospitals that deal with communicable diseases say the right things, but do not practice them.

Swiss Agency for Development & Cooperation (SDC) SDC's "Regional Rural Water Supply and Sanitation Project" report describes the conditions in three villages of over 20,000 people. Water is obtained by tanker trucks, from wells and sometimes directly from canals. They are running control studies in other villages to permit comparisons with the improvements they are making to their target cities. They are also conducting studies of parasites.

SDC's goal is to develop a new water supply system in Tajikistan that:

(1) Includes a policy dialog with the Ministries of Land Reclamation and Water Resources, Housing and Reconstruction, with the goal of leading to reforms,

(2) Addresses ministerial reform,

(3) Encourages networking of relevant organizations, including relevant past experience, community tasks and responsibilities, and problems of poor materials, and

(4) Results in the development of a model for governmental reform, which includes setting up a District Trust Fund to improve rural water supply, based at the *jamoat*, or village group level.

SDC feels that there has been inadequate dialog among NGOs and donors, and would like to see an integrated approach to needed reforms in the community water sector.

UNICEF Their project has the objective of promoting hygiene and sanitation education in schools. They have conducted surveys and assessments that show that water supply in hospitals is in very poor condition, and that food is below desirable standards. They work only in rural areas, where the problems are greater than in the cities. Rural water departments are responsible for water and sanitation. Schools are supposed to provide adequate latrines and hand washing facilities, but most do not, largely because of budgetary limitations. In many cases, they do not provide separate latrines for boys and girls. When water is provided for hand washing at the schools, there is a problem of freezing in the winter. (Note: Power was lost at the mid-point of the meeting — not an uncommon occurrence.) UNICEF, with WHO's participation, prepared a water-quality study for Tajikistan. There has been no follow-up action to implement the report recommendations, and people tend to adhere to their old water-use habits. Groundwater levels are commonly at about 10 meters but it is necessary to go down to about 40 meters for good quality water.

World Bank The Bank is one of the sponsors of a program to improve water supply and sanitation in eight cities, in the 20,000 to 50,000 population range. This program is providing $15 million as a grant. A program for improvements to the Dushanbe water system is being funded by a loan that was made in 2002, and the program is expected to continue to about the end of this year. The principal sources of water are from two groundwater well sites, plus surface water from the mountains that will not be treated, but only chlorinated. About 75% of the population of Dushanbe receives water 24 hours per day. There is a roughly 150 meter difference in elevation in Dushanbe, so some of the higher areas receive water only periodically. Typically, such areas receive water from 9am to 1pm, and then again from 5pm to midnight. Metering is quite limited and revenues do not cover costs. Meters fail in what was called "brown water areas", presumably where residues foul the water meters.

Chlorine gas is expensive as it must be imported and that, as a consequence, in many cases inadequate amounts of chlorine are applied. The Bank and other donors are considering another loan for wastewater project improvements in Dushanbe. Bank funds are made available through their Project Implementation Unit, which is associated with the implementing agency, the Communal Services & Housing Agency.

The "Eight Cities program" started in 2004 and is expected to be completed in 2011. The project has three components: (1) physical improvements (pipeline replacement, furnishing vehicles and equipment); (2) institutional strengthening (of the vodokanals in each city under the "State Unitary Enterprise", which appears to have overall control of the projects); and, (3) project support (which was not clearly defined, but may include consultancies for the three components).

The Bank will provide a total grant amount of $15 million: (1) $12 million for the first component; (2) $150,000 for the second; and, (3) $2.75 million for the third. The institutional strengthening component includes assistance in leakage detection and in strengthening the management and financial capabilities of the vodokanals. This work is being implemented by staff of the Urban Institute. The Bank has selected private consultants to assist in the various project components: "Yash", a Turkish firm, for project studies and designs; Bangladesh Engineering Technical Service, Ltd. (BETS), for leak detection; and, "TBW", an Austrian firm, for institutional strengthening and increasing revenue.

In the city of Vahdat, water system improvements have already increased the hours of water service from two hours each in the morning and evening, to four hours in the morning and about three hours in the afternoon. Moreover, water pressures during that time have increased so that water can reach higher levels in the buildings. The cities and their populations are listed below. Total population of the eight cities in the World Bank project is 346,000.

Editor's Note: When visiting Vahdat, they said their population was now 55,000, so the population data listed below may be old.

1) Danaga - - - - - - 20,000
2) Kulob - - - - - - - - 82,000
3) Vose - - - - - - - - - 20,000
4) Istaravshan - - - - 55,000
5) Kanibadam - - - - 47,000
6) Kurgantyube - -- 65,000
7) Vahdat - - - - - - - - 45,000
8) Garm - - - - - - - - - 12,000

Urban Institute (UI) UI provides training and technical assistance, and is involved in funding basic water supply systems in rural areas, and programs to improve solid

waste management. They find that by making relatively small grants to effect system improvements, they are able to increase utility rates for these improved services. They employ rather sophisticated tools such as "Water CAD" to conduct electronic analyses of the hydraulics of water systems to determine the most critical improvements required. They also purchased modern leak detection gear ($5,000) that they apply to village water systems to detect and repair water leaks. They noted that about 75% of the entire population lives in rural areas, which are poorly served by water systems.

UI is involved in institutional strengthening of the eight cities described under the World Bank program. TBW, an Austrian firm, is also involved in some form of institutional strengthening on the WB Eight Cities program. In general, UI is involved in the following types of projects in the country:

(1) General technical assistance
(2) Institutional development
(3) Citizen participation

Oxfam Oxfam had provided assistance in water and sanitation improvements in some 150 locations. One study showed that, of some 30 village water systems previously constructed, only a few are still functioning. Oxfam's strategy has been to: (1) gather information; (2) continue their focus on water supply; and, (3) play an advocacy role in seeking improved water service.

International Society for Water (ISW) With SDC funding, ISW is managing the Regional Rural Water Supply Project, which is also working in Uzbekistan and Kyrgyzstan. In Soviet times, little attention was paid to rural areas and small towns, but such facilities as were constructed are now very old and poorly functioning. Of the some 75% of people in the country who live in rural areas, no more than 20% of them (15% of the country population) have access to reasonably good water, and none have piped water. The objective of the current Swiss project is to rehabilitate any existing "water points", and to build new ones. There are no standpipes now in the rural areas. They just started last year and have not completed any works yet. Water quality is generally hard, and there are other problems. When available, said to be only for about four to six months, water is taken from irrigation canals, but these canals are dry the rest of the year. Some water is available from factory-owned wells. When there is no water available in their area, a family of five-to-fifteen people may pay up to $300 per year to have water trucked in. They also referred briefly to another district (Balan) as having been neglected.

ISW conducted a study on health, income and willingness to pay for water. The study title was "Results of Baseline Assessment of Hygiene and Sanitation", dated July/August 2007. They also cited another study, "Community Profile" of five villages, covering the period June–November 2007. Copies of these reports are available on request. For their planned improvements, they propose to develop new

systems that can provide 50 liters per person per day (lpcd). They propose to enter into agreements with factories that own water systems to allow access to this water by villagers, but it was not clear how this was to be achieved. They mentioned one target area for improvement as some 11 villages with populations ranging from 15,000 to 60,000, in Kamibadan district.

Editor's Note: These populations seem more appropriate for cities than villages. In addition, water usage levels of 50 lpcd are more indicative of piped water systems, as these amounts seem too high to be carried from any distance.

Mercy Corps The assessment team visited the village of Niyazok (population 5,000), which is about 80 km northwest of Khujand, in Kanibadam Rayon. At Niyazok is the site of a former irrigation well and pump station. Some work had already been done with the assistance of Mercy Corps to rehabilitate the pump station. The local village group that will be responsible for the new system met us at the site. When completed, the well will serve about 20,000 people in the village of Culister (?), one of several villages in the Sharipov *jamoat*. As is common in Tajikistan, responsibility for constructing the systems is under separate control from responsibility for operating the facility. The construction work done to date was a bit shoddy, with uneven concrete work, rough welding, and installation of pipes at the well out of plumb.

Tajikistan Entities

Khujand Water Company The water and wastewater company (vodokanal) was established in 1939 and serves some 180,000 people in and around Khujand**.**

Production and Customers
Khujand Water Company produces 30 million cubic meters per year and about 75% of this is delivered to customers, resulting in a consumption rate of 335 liters per capita per day. The system has about 200 km of water mains and about the same for sewers. Five pump stations extract water from wells, and another 86 wells extract water from adjacent to the river, at depths of from 150 to 180 meters. Water quality is generally good except for high levels of hardness. The distribution system is fairly old, and consists of cast iron, steel and asbestos cement materials.

Distribution and Metering
All the extracted water is pumped to reservoirs where it is chlorinated, and then pumped to several separate zones on each side of the river. House connection piping is currently mostly steel, but they are gradually replacing this with plastic (PE) pipe. They have also replaced 37 km of older distribution piping with new PE piping. About 60% of customers live in single family houses and rest in apartment buildings. The goal is to have 100% metering but they just started on this last year, and are now up to 35% metered. They have purchased but not yet installed another 10,000 meters. Under the Soviet system, house connections were the responsibility of customers, but

they now accept responsibility for all piping. Since May 2008, they have provided water for 24 hours per day for the entire system. They are using meters of a French design, manufactured in Switzerland. The unit cost is about $50, but this includes all the associated piping and valves, as well as the installation. They have developed the capability of calibrating and repairing their own meters. Generally, they install a new service line with each new meter to avoid fouling the meter with rust from the old lines.

Pricing and Finances

Water rates must be approved by the Ministry of Economic Development & Trade, but then they are subject to review by the Anti Monopoly Company (national level). Finally, the rates are subject to the approval of the Mayor's office of the Khujand Municipality. It takes about three months to obtain final approval, but they were able to raise rates twice in 2008. The current rate is now 0.35 Somoni (about $0.11 per cubic meter. This rate is applied regardless of the amount of water used, but they have different rates for different categories of customer: houses, shops, schools, manufacturers. The utility was able to raise its rates significantly as service improved. The factors that most impact their rates are salaries (25%), energy (20%), fuel oil and what they refer to as "profit", but which is essentially a special account for contingencies. The utility actually made a profit last year, in which their revenue paid for all their expenses with funds left over. An interesting aspect is that revenue collectors receive added income for meeting higher revenue targets.

Employee Compensation and Supervision of the Utility

The municipality supervises the utility, and sets the salary of the utility director. One staff member reports that he has a personal services agreement with the Municipality. He prepares a quarterly report on a Statement of Operations to the Municipality, which is reviewed and approved by them. His Agreement with the Municipality was negotiated two years ago and can be extended by mutual consent. His salary includes a base amount plus additives for meeting agreed upon objectives. All of this is established in the utility's "charter" or agreement with the Municipality. Since 2004, he has entered into individual agreements with all 630 employees of the utility. He has had talks with some 18 of the larger vodokanal directors and they are interested in following the example of Khujand. However, this depends upon the approval of the Ministry of Economic Development & Trade, but not all city governments are willing to adopt these procedures. The staff member feels that the individual city governments should be responsible for this, and not the Ministry. Generally, mayors are reluctant to raise water rates because that's unpopular, but the staff member has been able to convince them of the need to earn adequate levels of revenue to maintain quality of service. There were indications that the staff member probably would prefer to have the utility become privatized.

Discussions with Utility Staff

When asked about how best to help other utilities make similar needed improvements, one staff member said they needed to build up greater technical expertise among the staff. He suggested that the vodokanals located in northern

Tajikistan form an association to share experience. He said, for example, that his utility's accounting system could be a model for others to adopt. When asked if successful vodokanals could serve as consultants/advisors to assist weaker utilities, he said that, in Soviet times, they served regional areas, but the current Ministry that controls the vodokanals is reluctant to cede their power to others.

Other Government Involvement in the Water Sector

The **General Public Works Group** covers cities and towns in all but the eight "sections" (rayons?) of the country that chose instead to be under the "State Unitary Enterprise" (SUE). This appears to be the current name of what was once the national department or Ministry of Housing & Communal Services. There are 44 rayons (districts) in the country, and three oblasts (provinces). SUE implements state policies for all utilities. Formerly, the State owned all utilities but a new law says that water utilities can be privately owned. SUE has three regional centers for teaching basic technical trade skills.

Tajik Selka Ozvedoprovod is an irrigation-related organization, but it also provides some drinking water.

Individual Municipal Water and Wastewater Utilities (*Vodokanals*) These are the water and wastewater departments in the country's cities and larger towns. There are about 35 cities with populations above 10,000 people.

National Organization for Rural Water Supply (Tajikselkhozvodoprovvodstroy)

Current Operations and Funding

A staff member said that they supply potable water (90%) and some irrigation water (10%) to villages, and they also provide some water to vodokanals. The staff member said they have their own sources and pump stations. He said it was difficult to supply water now, as they have to pump to 50 to 60 "firms" where before it was to a single kolkoz (collective farm). They earn a total of 1.2 million Somoni (about $400,000) per year and the government provides another 400,000 Somoni per year to help support their work, but he said their total annual expenses are about 3.5–4 million Somoni (about $1.2 million). It was not clear how they bridge that gap in income and expenses, but he did say that they received some money from the Hukamats, the Ministry and some from donors. Their goal is to provide 92 to 95% of the rural population with water by the year 2020. When asked how this was possible, he said they expected to get 10% of the needed funds from income from users, 20% from the government budget and the remaining 70% from donors. He described several modest assistance programs provided by a mix of donors. When asked about having to depend so heavily on donor assistance, he said that the government's

strategy for them was to reconstruct old works and to do that, they have to have funds from the donors. When asked about charging users for services received he said that they used to get water free from the kolkozes, so they don't want to pay anything now, either.

Organization and Operations
Their headquarters are in Dushanbe and they have offices in some 24 rayons, or about half of them. The total staff numbers 1,200, down from 2,500 several years ago. The National Organization for Rural Water Supply has about 40 to 50 employees in each rayon office and about 50 people in the Dushanbe office. In a typical rayon office, there is one chief, one accountant, three foremen, and the rest are "technical" people. One staff member stated that, because many of their old facilities are now broken, the Organization doesn't need as many people to take care of them. He said that some water user associations used to maintain their systems, but now they are struggling financially and want to give these facilities back to his organization.

Vahdat Vodokanal (Water & Wastewater Utility) The City of Vahdat is located about 25 km northeast of Dushanbe.

Description of the Vodokanal and the City it Serves
Vahdat's population was 44,000 in 2002 and had increased to 55,000 by 2004, a 15% increase in two years. There is no indication of what it might be now, but it is probably higher, and the percentage served has probably fallen lower. They only serve about 31,500 people now, or 57% of the 2004 population, leaving more than 23,500 people to search for water from the nearby river, canals or — almost certainly — partly from illegal connections to the system. A staff member specifically stated that 14,000 people were waiting for new houses to be built for them in Vahdat. Some 20 hectares of land has been designated for the construction of new housing. The company only employees 104 staff.

Status of the Water System
Their water source comes entirely from wells. They report that water is produced at a rate that amounts to 500 lpcd, which indicates significant system losses or large numbers of illegal connections, and probably both. A staff member says they cannot control illegal taps. Residents are legally required to apply for a connection to the water mains, but many do not. They have no public faucets and no metering. There is no capacity in the country to manufacture chlorine gas, so all chlorination is done by using chlorine in powder form. Programs for improvements are described in following sections, but a staff member said that, other than installing about 500 meters of new pipes, no significant programs are planned for improving the distribution system.

Electrical Supply
Currently, power is said to be available only about eight hours per day. A new electrical line is proposed, at a cost of 50,000 Somoni (about $15,000) that will serve

the vodokanal directly, thus providing power for 24 hours per day as opposed to the present eight hours or so. Funds for this have been provided by the Hukamat.

Future Plans for Development
The vodokanal, with the approval of the state government, has prepared a 10-year plan for improvements by the year 2020. While no cost estimates were provided, the sources of funds were indicated as percentages. This ambitious plan is based on receiving grant funding from various parties as follows:

Central Government	15%
Local or Hukamat	10%
The Vodokanal	5%
Donor Grants	70%

The Hukamat provides some funds for "special" capital improvements but none for operations. A staff member admitted they had no offers of significant new funding from donors, but he said if they are not made available, there will be no future programs of improvements. The current improvements are being made with the $2.4 million grant from the World Bank, described under "Role of Donors", below.

User Charges
For households, the rate is 2.66 Somoni per person per month for water, if they are not sewered, and 3.88 for both water and sewerage, if they are connected to a sewer. The commercial rate is 0.24 Somoni per cubic meter. This seems to indicate that businesses are metered, but that was not clear.

A staff member said they do not meter their water, but the World Bank, under their program, has undertaken a pilot study of installing 450 meters of varying size in one area of the city. They send out bills monthly. They hire 15 private agents who each have a district for which they are responsible. They are paid a fee that amounts to 15% of what they collect, a practice that is common among Vodokanals in Tajikistan. Average monthly collections range from about 2,000 to 3,000 Somoni per collector, which would result in agent income of 300 to 450 Somoni per month per agent. When asked about the consequences for non payment, the staff said that delinquent customers receive three warnings, following which the utility shuts off the water service. The utility can also bring delinquent debtors to court, and last year they collected 9,000 Somoni from the court for back payments.

Role of Donors and the Government in Assisting the Vahdat Vodokanal
The major assistance they are currently receiving is a $2.4 million grant from the World Bank. (Note: The Bank provides grants only in rare cases to the poorest of utilities.) The Bank is currently funding three new water pump stations, taking water from existing wells, and three new chlorination stations. The three new pump stations have a total capacity of 375 cubic meters per hour, operating at 89% capacity. When completed, these pump stations will receive power directly from the power utility, thus being able to operate 24 hours per day. Currently, power is said to be

available only about eight hours per day. They also used Bank funds to clean and flush five old Soviet-era, existing wells to increase their capacity. These rehabilitated wells are expected to produce a total of 240 cubic meters per hour. Assuming 24 hours per day operation, these two clusters of wells would provide a total of about 15,000 cubic meters per day. This relates approximately to the director's statement that they are providing 500 lpcd to their 31,500 customers (15,750 CMD). However, the three new wells/pump stations and those being rehabilitated are not yet in operation, so possibly the present output is coming from other existing older wells. They are currently executing a three-stage program (presumably with Bank funds). The details were not clear, but notes indicate:

Stage 1	Rehabilitation of three old wells/pump stations
Stage 2	Construction of two new wells/pump stations (and possibly more)
Stage 3	Four new wells/pump stations and a 2,000 cubic meter water storage tank

A staff member said that these plans do not include distribution system improvements, but BAS, a Bangladeshi consultancy under the World Bank team, is conducting leak detection studies. BAS has trained local vodokanal staff on the operation of this leak detection equipment. BAS will leave their equipment in the country when they complete their work, but their four sets of equipment are to be shared among the eight vodokanals included in the World Bank assistance program. Administratively, the World Bank program is also providing six new computers to be used to establish a database and incorporate financial data. It was not clear if all of this equipment will be retained by Vahdat or shared among the other seven cities in the program. Another World Bank sub-consultant, TBW, is providing some sort of institutional strengthening assistance.

Status of the Wastewater Treatment Facilities The site of the wastewater treatment facilities, said to have ceased operation in 1995, was located several kilometers downstream from the water facilities.

Basic Facilities The works were built at some unknown date (possibly about 1966) during the Soviet era. The original design was for a secondary (primary sedimentation followed by trickling filters) wastewater treatment plant with a capacity of 4,500 cubic meters per day. Assuming significant infiltration, this flow might represent about 300 lpcd. On that basis, the plant would have a capacity for about 15,000 people, or less than a third of today's population. This figure agrees with the comment by one of the vodokanal workers that the original capacity of these works was designed for 15,000 to 20,000 people. Most of the wastewater flow has to be pumped to the site, but a portion of it reaches the site by gravity. When asked, no one could provide an estimate of the BOD (biochemical oxygen demand), a common measure of the strength of wastewater. A reasonable guess is that the BOD levels are on the low side, because the significant amounts of infiltration, internal water waste

(leaking toilets and sink faucets), and lack of significant commercial and industrial wastes, taken together, would tend to dilute the wastewater.

The original basic design appears to have been to have the incoming flow go through bar-racks or rough screens, but those facilities were not in evidence. They may well have been housed in some of the many small structures on the site that now seemed to be used for storage of grasses, perhaps for the cattle seen grazing nearby. The roughly screened flow would have then been pumped to a set of about seven oval bottomed sedimentation tanks, located on an embankment about five or so meters higher than the remaining flat site. It was not clear how the sludge was intended to be disposed of after removal from these settling basins, possibly to sludge drying beds, which are not very effective for raw sludge. There was no sign of any sludge digestion tanks. The decanted supernatant probably would have been piped to a series of rectangular trickling filter beds. It appeared that the decanted and partially de-sludged wastewater was then intended to be piped to a large number of fixed nozzles, where it would have been sprayed over a series of trickling filter beds. In such filters, the intent is that the clarified filtrate be collected at the base of the units and then discharged to the nearby river. There was no way to determine how the dried sludge was intended to be disposed of.

The works, having been abandoned since 1995, were in too great a state of disrepair to be certain about the original design process intent. It also seemed clear that the condition of these works had deteriorated behind the point of economic recovery. At the time of the visit, a relatively small flow was entering the site through open channels where it eventually was discharged to shallow holding ponds, presumably created after the works ceased to function. The small flow was because the visit occurred during a period of power outage, a routine occurrence. The vodokanal personnel said when power resumes, the entire collected wastewater flow from Vahdat is pumped to the site. The staff said that this flow now goes to a series of shallow ponds located at the site near the edge of the river. They also said there were fish in the pond, and that the entire flow seeps into the ground rather than overflowing to the river. There may be fish, as some form of carp can live in almost any condition of water, but it is inconceivable that raw sewage would not clog the bottoms of any basins, even the most sandy. The only conclusion is that the great majority of the wastewater collected in the Vahdat system is discharged, essentially untreated, into the nearby river; either directly during power outages or further downstream when the power is operational.

State Unitary Enterprise (SUE) "Khojagii manziliyu-kommunali" The SUE was created by a decree of the former Ministry of Housing & Communal Services in 2001. The former Ministry of Housing & Communal Services had included TajikGas, but that is now a separate enterprise. The SUE contributes to the water supply and sanitation sector (wastewater management), solid waste management, central heating (in eight rayons), and property registration. Other than facilitating capital

expenditures, the central SUE organization assists the separate enterprises in the rayons by helping to set tariffs and develop business plans.

The two major projects in which donors have assisted the SUE include the World Bank-funded $16.5 million Municipal Service Program, and a Turkish-funded $1.6 million program in Jirgital Rayon, that operated from 2002 to 2006. Major challenges facing the SUE are the rise costs for electricity and water, set by the Ministry of Irrigation & Water Resources.

Ministry of Health/Sanitary Epidemiological Service (SES) Some 21 SES laboratories have the ability to test some chemical parameters, while all rayons have labs that can test for bacteriological contamination. According to the SES, 85% of water consumed in Tajikistan does not meet the SES's drinking water standards. Most sources have problems because water is not treated properly, and the lack of availability of chlorine in Tajikistan, and the unwillingness of local officials to invest in its use hamper the water situation.

To counter these problems, the SES takes action to urge the Government to undertake prompt action and to work on community-level health promotion. The SES continues to track the many disease outbreaks, but they generally know before testing, that the cause is contaminated drinking water. All new donor-funded water supply projects are now required by decree to be tested by SES before they can be commissioned. The SES seeks support in the following areas: (1) training of staff in water testing; (2) new equipment and reagents for laboratories; (3) mobile lab equipment for spot testing; and, (4) assistance with community awareness programs.

Strategies for Successful Investing Currently, the general outlook for reform at is bleak. There are significant vested interests in the upper echelons of the Government, some in conflict with others. Some donors, therefore, find it more effective to work at the rayon or municipal levels in making development investments, thus avoiding involvement with national sector organizations.

Donor Working Group The various donors in Tajikistan meet every other month to share information on activities and discuss problems and concerns. Earlier, they met only annually, but they have found that more frequent interchanges are advantageous. While the Finnish Government has expressed interest in becoming involved in funding projects in the country, the Swedish International Development Agency (SIDA) is said to be in the process of disengaging from work in Tajikistan.

Rural vs. Urban Sector Needs In considering a decision on whether to support urban or rural projects, several factors need to be considered. First, about 75% of the people live in rural areas versus 25% in cities and towns. Because of bleak conditions in the villages (no piped water, weak electrical services, and few jobs) there is concern about a shift of population to the cities. While attracted to the cities, they find it difficult to compete once there.

Annex B
List of Relevant Governmental and Donor Sector Organizations

1. Relevant Government of Tajikistan Sector Related Organizations

- State Unitary Enterprise (SUE; formerly the Ministry of Housing & Reconstruction)
- General Public Works Group (Includes most cities and towns)
- National Organization for Rural Water Supply (Tajikselkhozvodprovvodstroy)
- Department of Construction, Design and Operation of Water Supply Entities and Irrigation of Pastures, under the Ministry of Land Reclamation & Water Resources
- Dushanbe Vodokanal (Water and Wastewater Organization)
- Khujand Vodokanal (Water and Wastewater Organization)
- Vahdat Vodokanal (Water and Wastewater Organization)
- Note: There are about 35 communities with populations greater than 10,000. Some of these are probably villages, so the total number of traditional vodokanals is probably about 25.
- Separate service enterprises at some *jamoats*, which are clusters of villages
- Separate ownerless water supply entities in rural areas, water associations and committees, Dekhcan farms

2. Relevant National and International Donor Sector Organizations

<u>International or Regional</u>

- The World Bank (IBRD)
- United Nations Development Program (UNDP)
- European Bank for Reconstruction & Development (EBRD)

- Asian Development Bank (ADB)
- World Health Organization (WHO)
- CARITAS (Catholic Relief Services)
- Oxfam (UK, USA)

National

- United States Agency for International Development (USAID)
- Swiss Agency for Development and Cooperation (SDC)
- Water Users Association Support Program (WinRock Foundation) (USA)
- Urban Institute (USA)
- Mercy Corps (USA)
- Japanese International Cooperation Agency (JICA) (Japan)
- Turkish International Cooperation Agency (TICA) (Turkey)
- Bangladesh Engineering Technical Service Ltd. (BETS)
- MSDSP Affiliated with the Aga Khan Foundation. Minor work in village water supply. (Mager-Sahnequark-Dekorations-Sonder-Publikation)

Annex C
Selected References for Water and Sanitation Projects in Tajikistan

1. USAID/CAR Health Results Framework (draft)

2. Save the Children PHASE II Grant Agreement with USAID

3. UNICEF Multi-Indicator Cluster Survey Results (available at unicef.org)

4. Child Poverty in Tajikistan, UNICEF, January 2007. (http://www.unicef.org/tajikistan/Child_Poverty.pdf)

5. Poverty Reduction Strategy Paper 2007–2009 (draft), UN Mission to Tajikistan, 2006. (http://www.untj.org/files/reports/PRSP2FirstDraft.pdf)

6. Rapid Assessment of Drinking Water Quality in the Republic of Tajikistan, UNICEF, WHO, Ministry of Health of the Republic of Tajikistan, 2006. (http://www.untj.org/files/reports/RADWQ.pdf)

7. Water Sector Development Strategy in Tajikistan, UNDP, 2006. (http://www.undp.tj/files/reports/waterstrategy_eng.pdf)

8. Information on UNICEF's Hygiene and Sanitation Work with Schools in Tajikistan. (http://www.unicef.org/tajikistan/water_sanitation_4686.html) Partners UNICEF is working with: (http://www.unicef.org/tajikistan/partners_4504.html)

9. Local Governance and Citizen Participation Program in Tajikistan, Urban Institute, 2008

10. Resolution No. 514 of the Government of the Republic of Tajikistan, on the Endorsement of the Program of Improvement of Provision of the Population of the Republic of Tajikistan with Clean Drinking Water for Years 2008 – 2020, December 2, 2006

11. Khujand Water Supply Improvement Project, Tajikistan, External Evaluation Report, Swiss State Secretariat for Economic Affairs (SECO) and Brugger & Partners (BHP), December 2007.

12. Rural Water Supply and Sanitation Project, Ferghana Valley, Uzbekistan, Swiss Agency for Development and Cooperation, March, 2007.