

Sustainability and long-term impact of community-managed water supply in rural Kyrgyzstan, Central Asia

Chris Wardle and Nazgul Zakiriaeva

Abstract: *How can Community Managed Water Supply (CMWS) become more sustainable? Recent studies in several countries indicate that the sustainability of many CMWS is poor. As a result, their long term impact on village lives is limited. This paper presents the findings of research on the sustainability and long-term impact of a group of CMWS created by the Rural Water Supply and Sanitation Project (RWSSP) in Kyrgyzstan, Central Asia. This project adopted a Community-Based Approach to maximize the sustainability and long-term impact of its CMWS. The research assessed the sustainability of these CMWS a decade after their completion. It used six measures to assess sustainability and examined four long-term impacts. The results are compared with studies from other countries. The influence of Community-Based Approach (CBA) on the results is discussed. Recommendations are made for changes in policies and strategies to improve the sustainability and long term impact of future CMWS in Central Asia and elsewhere.*

Keywords: community-managed water supply, community-based approach, improving CMWS sustainability, long-term impact

Introduction

THIS PAPER PRESENTS THE FINDINGS of research on the sustainability and long-term impact of Community-Managed Water Supply (CMWS) in northern Kyrgyzstan, Central Asia. To date, there has been virtually no research published on CMWS from this part of the world. The paper looks at the sustainability and long-term impact of the Rural Water Supply and Sanitation Project (RWSSP) almost a decade after it ended. The project created CMWS and built or rehabilitated, depending on their condition, water supply systems (WSS) to provide clean drinking water to 203 villages of northern Kyrgyzstan.

Up until 1991, supply of drinking water in rural areas of Kyrgyzstan was provided by the state. All the villages had piped water systems with standpipes built, operated, and maintained by the government. No one paid for water. This ended with the collapse of the Soviet Union, of which Kyrgyzstan was a part. Kyrgyzstan no longer had the resources to operate and maintain these village water systems.

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As a result, the water systems fell into disrepair. Soon, many only functioned partially and in some cases, some stopped completely. A study by the RWSSP found 39 per cent of villagers had no access to clean water (PMC, 2008). Villagers now had to collect their drinking water from irrigation channels and rivers, often some distance from their village. This task fell to women and children. Children's health suffered. A British Department for International Development (DFID) project report, *Hygiene and Sanitation in Rural Areas*, found that 'between 61% and 79% of children in some rural areas were infected with the four primary parasitic infections: enterobiasis, ascariasis, giardiasis and hymenolepidiasis' (Kyrgyz Republic et al., 2013).

In 2002, the Rural Water Supply and Sanitation Project (RWSSP), funded by the World Bank and DFID, was launched to rehabilitate water systems in northern Kyrgyzstan. Its aim was to improve access to clean drinking water for 325,000 people. Recognizing the lack of Kyrgyz government resources to operate and maintain these systems, the RWSSP opted for a Community-Managed Water Supply (CMWS) model, where the village itself would run and look after its rehabilitated water systems (PMC, 2008).

The Project adopted a Community-Based Approach (CBA) to maximize village involvement and participation in all stages of planning, implementation, and subsequent management of its WSS. This included:

- assessing the villagers' need for clean water, experience in community management, and willingness to manage their rehabilitated WSS;
- having an input into the planning of the rehabilitation of their WSS;
- contributing towards the cost and work involved: 5 per cent of the cost plus local materials and some labour;
- creating a village water management organization (VWMO), the Community Development Water Users Union (CDWUU), to operate, manage, and maintain its WSS;
- providing capacity building and support for the CDWUU for up to 2 years after the construction phase.

The Project created a Community Mobilization and Capacity Building Team to implement a CBA in three northern regions: Issyk-Kul, Naryn, and Talas. It recruited 18 staff with experience in community mobilization and capacity building, with all but two based in the field.

While adoption of the CMWS model is relatively recent in Central Asia, it has been implemented since the early 1970s in much of Africa, India, and elsewhere to help improve provision of clean drinking water to rural populations in poorer countries (Schouten and Moriarty, 2008.) The performance of CMWSs to date has been mixed and the overall ability to provide villagers with a reliable supply of clean water over time has been modest. A survey of 11 least developed countries showed average water source reliability was 62 per cent (Davis, 2014). According to Davis, 'global water point failure has hovered around 40 per cent since the 1990s' (ibid.).

Several studies in different parts of the world have questioned the sustainability of water supply systems built using the CMWS model and their ability to regularly

function beyond 1–2 years. (Harvey and Reed, 2007; Montgomery et al., 2009; Schouten and Moriarty, 2008). Thirty-five per cent of all CMWS in sub-Saharan Africa are not functioning and operational failure rates range from 30 to 60 per cent (Harvey and Reed, 2007).

A variety of reasons are given for this poor sustainability, including poor design and construction, lack of perception of ownership, lack of maintenance, weak/ineffective VWMOs and water committees, unwillingness of villagers to pay for water, and lack of post-construction support for water committees (Tenaw, 2014; Harvey and Reed, 2007; Lockwood and Smits, 2011; Davis, 2014). Several initiatives have been proposed to address these issues and some have started to be implemented (Lockwood and Smits, 2011; Schouten and Moriarty, 2008; Davis, 2014; Harvey, 2016). Despite these problems, water policies for poorer countries still rely heavily on the CMWS model (Sun et al., 2010).

More recent studies in Kyrgyzstan indicate the scale of the challenge to provide clean drinking water to rural villages. A baseline assessment of access to water, sanitation, and hygiene in schools and hospitals in northern Kyrgyzstan in 2011 found only 59.6 per cent of schools had access to improved water sources (Domashov, et al., 2011). According to a study on gender aspects of access to clean drinking water in 2014, ‘about 600,000 people consume water from irrigation canals and rivers that exacerbate the sanitary and epidemiological situation, and is often the cause of major outbreaks of infectious waterborne diseases’ (Vashneva et al., 2014). A study by NGO Alga showed that 72 per cent of rural women are responsible for fetching water for the household (ibid.). Kyrgyzstan has recently launched a Sustainable Rural Water Supply and Sanitation Development Project 2017–2021 to address these challenges.

Methodology

The research was carried out in August 2015. Due to limited resources, it was decided to focus largely on one District (Jeti-Oguz) in Issyk-Kul Region, though a brief visit was also made to the adjacent Tup District.

A stratified sample of 10 CMWS was taken from the 17 CMWSs built under RWSSP in Jeti-Oguz. This was done to ensure the sample was representative. Two CMWSs in neighbouring Tup were included, making a total of 12 villages. Later, two CMWSs built in Jeti-Oguz since 2008 were visited to see whether lessons learned by RWSSP had been taken into account.

Information was gathered using interviews, focus groups, and observation. Stakeholders in each village were interviewed using questionnaires. These included the 12 CDWUU, 10 *Aiyl Okmoty* (mayor) or his or her representative, eight *Aiyl Bashi* (head of village), 11 village schools, 10 village health centres, and six village health committees. Information from village women was collected using focus groups. Two were held in smaller villages and three in larger villages. In total, 252 women participated in these focus groups. This gender bias was intentional: women are the ones most affected by the presence or absence of clean water in their village.

Half a day was spent with the Jeti-Oguz CDWUU Network. Both qualitative and quantitative data were collected, then analysed on Excel. Before interviewing, all were informed about the nature of the research and asked for their consent, which was given verbally. Six key measures were used to determine the sustainability of the CMWS. Each was assessed using two to four indicators (Table 1).

To assess the longer-term impact, the study looked at changes since 2008, in four important impact areas: women's lives, children's health, village attitudes to drinking water, and health and sanitation infrastructure and knowledge. Each was assessed using two to four indicators (Table 2).

Table 1 Key measures of sustainability and indicators

<i>Key measures of sustainability</i>	<i>Indicators</i>
Performance of CMWS and water service provided	Number of people served Quality of water Satisfaction with water service
Improvements made to water supply system and service since completed	Number of household (HH) water connections made Proportion of HH with water meters Extension of WSS to other parts of village
Technical capacity of CDWUU	Adequacy of equipment to repair Speed of repair Number of major breakdowns
Financial viability of CDWUU and WSS	Proportion of HH tariffs paid annually Other sources of income CDWUU reserves Improvements made in systems
Organizational capacity of CDWUU	Active chair Proper office and equipment Adequacy of CDWUU salaries
CDWUU relationship with partners and others	Membership/involvement with CDWUU Network Number of organizations CDWUU has a working relationship with

Table 2 Long-term impacts and indicators

<i>Long-term impacts</i>	<i>Indicators</i>
Women's lives	Time saved Cleanliness of house Comfort/ease of women's lives Women's role in CDWUU
Children's health	Incidence of waterborne diseases Cleanliness of children Time spent collecting water
Village attitudes to drinking water	Initiatives to extend WSS Willingness to look after the WSS Proportion paying water tariff
Health and sanitation infrastructure and knowledge	Inclusion of health and sanitation in school curriculum Number of schools with functioning hot and cold water Incidence of washing hands by kids after toilet/before meals

Results on sustainability

Performance of Community-Managed Water Supplies and water service provided

The number of people currently served and the proportion of the population served in the 12 villages are shown in Table 3.

A total of 20,371 people were served. The proportion of village population served ranged from 62 to 100 per cent, with an average of 89.4 per cent. However, four villages (25 per cent) reported issues with the reliability of the supply of water in parts of their village, especially in summer. Two-thirds of villages rated their water clean or very clean. The rating was higher for WSS using boreholes. However, women from villages relying on springs or catchment sources complained their water was sometimes dirty for a few days after heavy rainfall. Only one CMWS used the chlorination facilities built by the RWSSP. Women water users were asked to rate the overall quality of water services provided by their CDWUU since 2008. The ratings are shown in Table 4.

Table 3 Number of people served

<i>Village</i>	<i>Number of people served</i>	<i>Proportion of population served (%)</i>
Chirak	1,575	100
Munduz	1,363	100
Kortai	422	100
Urduk	1,867	68
Orogochor	2,500	100
Polyana	3,175	100
Jalguz Oruk	1,129	100
Chon Kazil Su	707	79
Darkhan	4,330	64
Jele Dobo	844	100
Dolon	1,147	100
Sure de Bouef	1,312	62
Total served	20,371	Average 89.4%

Table 4 Rating of water service

<i>Rating</i>	<i>Number of CDWUUs</i>	<i>Percentage</i>
Very good	3	25
Good	3	25
Average	3	25
Poor	1	7
Very poor	2	17

Improvements made to water supply system and service

Since 2008, 11 of the 12 CMWSs have made important improvements to their WSS and the village water service. Household connections have been made, replacing standpipes in these villages. The proportion of households connected varies by village from 50 to 100 per cent (Table 5).

Health posts and schools also have water connections. However, schools in four villages said they did not always have a regular supply of water and one had no water. Ten CDWUUs also installed water meters when connecting households to the WSS. A total of 985 households in 10 villages have installed hot water heaters using loans accessed by the Jetti-Oguz CDWUU Network. A further 659 households have installed water heaters by themselves. A handful of households have gone further, installing showers, flushing toilets, and a few have even bought washing machines. All the schools connected to the WSS have water heaters, as do village health centres. Four CDWUUs have extended their WSS since 2008 to provide water to new neighbourhoods. These extensions collectively serve an estimated 4,500 more people.

Table 5 Proportion of households connected

<i>Proportion of households connected (%)</i>	<i>Number of villages</i>
100	6
80–99	3
60–79	3
Less than 59	2

Technical capacity of Community Development Water Users Unions

Seventy-seven per cent of CDWUUs said they had adequate equipment for maintaining the WSS and doing basic repairs. Sixteen per cent had some, but not enough, and 7 per cent said their equipment was completely inadequate. All either had the technical expertise to maintain their WSS and make minor repairs or could access it in their village. Four CDWUUs reported having intermittent technical problems with the filtration systems on spring or catchment water sources. Two WSS have had major breakdowns since 2008, in both cases to do with borehole pumps, which were replaced promptly. Water users were asked to rate the speed of repairs to WSS breakdowns. Eighty-five per cent rated it reasonably quick to very quick (Table 6).

Table 6 Speed of breakdown repairs

<i>Speed of repair</i>	<i>Percentage</i>
Very quick	15
Quick	47
Reasonably quick	23
Slow	15

Community Development Water Users Union financial viability

The proportion of households paying their water bills to their CDWUU is shown in Table 7. In the majority of villages, most households are paying their water bills. However, in a quarter of the villages, 50–60 per cent of households are paying and in two villages it is less than 50 per cent. Only two CDWUUs have other sources of income, both from mobile phone antennae mounted on their borehole reservoirs. However, all CDWUUs that installed household connections reported saving money by no longer having to maintain communal standpipes.

Only 2 of the 12 CDWUUs had any reserves. Unfortunately, information on CDWUU debts was not systematically collected. However, eight reported being behind on repayment of loans and payments to the government Social Fund and taxes. Fifty-five per cent of CDWUUs have reviewed and increased water rates in the last three years while 45 per cent had not. Seven of the 12 CDWUUs have introduced a simple, improved monthly billing system developed with Peace Corps volunteers to improve both transparency and collection rates. The bills clearly show each household their monthly water usage and apply the current water rate to show the cost of water used. Households are given a receipt when they pay their bill.

Table 7 Proportion of households in villages paying for water

<i>Proportion of households paying for water (%)</i>	<i>Number of CMWS</i>
90–100	5
70–89	2
50–60	3
Less than 50	2

Organizational capacity

Seven of the 12 CDWUU chairs were rated active by those interviewed, four moderately active, and one not active. Within the last two years, new, younger and more active chairs have replaced two CDWUU chairs considered to be ineffective. Nine of the CDWUUs have an office, with many based in local government buildings, and others share with organizations like the village health committee. Seven CDWUUs are well equipped, including computers and printers funded by a grant. However, all 12 CDWUUs said staff salaries were low, sometimes very low, and in one case, not all staff were paid.

Relationships

All CDWUUs but one work with several organizations and officials both within and outside their villages. Within, the most important relationships are with: the school (which helps distribute information for the CDWUU and teaches about water); the village health centre (provides information on village health, teaches hygiene and sanitation); the village health committee (raises awareness on health, hygiene, and sanitation); the women's committee; and the village head, the Aiyi-Bashi.

Outside the village, the Aiyi Okmoty or mayor is the most important partner. He or she pays the village school's water fees; in three villages, he sometimes contributes to CDWUU salaries. He can impose sanctions on households not paying their water fees by blocking any state benefits they receive; sometimes provides equipment to help repair the WSS and, in two cases, has contributed money to help the CDWUU extend and/or improve their WSS.

Overall sustainability

To assess CMWS sustainability, scores were given for the indicators, with 1 being low and 5 high. These were added together to produce each CDWUU's 'sustainability score'. The maximum score achievable was 90. The distribution of sustainability scores is shown in Table 8.

Sixty seven per cent of the CDWUUs are considered to be strongly sustainable or sustainable. A further 16 per cent have the potential to become sustainable if they make changes and improvements in at least two of the key areas of sustainability. The remaining 16 per cent need to make changes in all five areas.

Table 8 Sustainability of CMWSs

<i>Range of scores</i>	<i>Number of CDWUUs</i>	<i>Rating</i>
73–90	3	Strongly sustainable
55–72	5	Sustainable
37–54	2	Need some strengthening to be sustainable
19–36	2	Need a lot of strengthening to become sustainable
Less than 18	0	Unlikely to become sustainable

Results of long-term impact

Women's lives

Women in focus groups were asked about time saved since having household water connections. The great majority, 86 per cent, said they saved a lot of time, while 14 per cent said it was modest. Time saved ranged from 30 minutes to 60 minutes a day. All reported that having water in the house made cleaning much easier and that their houses were cleaner than before. Over two-thirds (71 per cent) also said they felt their lives 'were considerably easier' than before. The majority of these had hot water heaters. The remainder said their lives had improved modestly. Time saved was used for productive activities and looking after children. Only one out of the 12 CDWUUs had a female chair. Women still largely fill only secondary roles such as bookkeeper/accountant.

Village health

Health centres and village health committees all reported a drop in water-related illnesses and diseases such as hepatitis, diarrhoea, and internal parasites in village

children since their WSS were completed. Five health centres reported fewer children catching bad colds in winter, as they no longer have to go out to collect water in sub-zero temperatures.

All village schools and most focus group women (82 per cent) say the children are cleaner. This is particularly true for those households who have hot water. Children are reportedly more willing to wash themselves than previously. Those schools with a regular supply of water reported that teaching time was no longer disrupted by children having to collect water for their family and school.

Village attitudes

The proportion of households paying their water fees has increased since 2008 from 64 per cent to 75 per cent. As noted earlier, four CDWUUs have extended their WSS to serve new parts of their villages. Together they have laid 30 km of new water distribution piping, which supplies an estimated 900 new households with clean drinking water.

Health and sanitation

Eighty-three per cent of village schools now have hot as well as cold water, though as noted earlier, in four of these, the water supply is not always regular. According to school directors and teachers, having hot water has had an impact in several ways: making it easier to keep the school clean; allowing the school to provide hot meals for the younger children; and enabling one school to install indoor flushing toilets which replaced the traditional pit latrines. In all the schools visited, health and sanitation are now part of the school curriculum and taught in all classes. This is done with the help of the village health centre. Those schools with a regular supply of hot and cold water all reported that children are washing their hands more regularly than before, especially after going to the toilet and before meals.

Wider impacts

Two unexpected changes were noted during the study. The first is the expansion of the water service in Jeti-Oguz Rayon through the creation of two new CMWSs. Both used the RWSSP's Community-Based Approach to mobilize the villages and build the capacity of the CDWUUs. Both gave particular attention to encouraging the participation and involvement of village women.

The second is the development and growth of the CDWUU Network. All 17 CMWSs in Jeti-Oguz are members. It organizes meetings where member CDWUUs share and exchange experience and discuss issues and problems such as budgeting, dealing with the government's Social Fund, tax, and reporting to official bodies. It has made members aware of opportunities such as availability of finance for household water connections, water meters, and heaters as well as obtaining grants for office equipment. Ten CMWSs have benefitted from these loans and grants. The network is led by an active and dynamic chair.

Discussion

This section compares the sustainability of CMWS in this study with other studies, identifies the key factors influencing CMWS sustainability, presents the issues and challenges currently faced, discusses the relevance of the findings for Kyrgyzstan's water and sanitation policy and discusses the limitations of the study.

Comparison of sustainability with other studies

After nearly a decade, all the WSS in this study are still functioning compared with only 65 per cent functioning in sub-Saharan Africa (Harvey and Reed, 2007). While global water point failure averages 40 per cent (which implies many people are not served) (Davis, 2014), here 89.4 per cent of the population is served. Ratings of the quality of the water service provided show two-thirds of the CMWSs are providing a good or very good service, while another 21 per cent were rated average. Only 23 per cent were rated poor.

Two thirds of the CMWSs in this study were rated to be sustainable or strongly sustainable. Our study looked not just at current sustainability (whether the CMWS was functioning and providing clean water) but whether it was likely to be sustainable in the future.

Key factors influencing sustainability

The study has identified some of the most important factors that have influenced sustainability. The first and most important was the implementation of a Comprehensive Community Based Approach which raised awareness, mobilized villages, supported them to create their CDWUU and subsequently strengthened their capacity. This is highlighted by the experience of the two least sustainable CMWSs, Darkhan and Sure de Bouef. Both were part of a RWSSP pilot project, which started before the creation of the Community Mobilizing and Capacity Building Team. As a result, they lost out on much of the support and capacity building provided by the CBA.

The experiences reported on also indicate that the chair is the key person in the CDWUU. He or she largely determines the organization's performance and the quality of the village's water service. For many years, the same two villages were led by passive and largely incompetent chairs. Their WSS were not maintained and, as a result, the proportion of households served fell to 22 per cent in Darkhan and 31 per cent in Sure de Bouef. Collection of water fees fell below 10 per cent. Eighteen months ago, both villages finally replaced their chairs. Since then, the proportion of households served has risen to 65 per cent and 72 per cent, respectively, and water fee collection rates are now approaching 50 per cent in both villages.

Resources to strengthen capacity of the CDWUU were also important. The CDWUU had, on average, 20 months of training, advice, and workshops from the Community Mobilizing and Capacity Building Team after the completion of its WSS. These covered a wide range of relevant topics such as tariff collection and budgeting. Since 2008, this has been complemented by workshops organized by local NGOs and the CDWUU Network.

There is a clear correlation between the quality of service provided by the VWMOs and the willingness of households to pay for water. In five out of six CMWSs with a service rating of good or very good, tariff payment rates averaged 96 per cent, while installing water meters and a simple computerized billing system have helped to improve collection and payment of water fees. Meters prevent the under-reporting of water usage and the billing system improves the transparency of household water bills and makes households confident they are correct.

As expected, internal and external relationships are important. Links with the schools and village health centres have raised awareness of the importance of clean water and hygiene while Aiyl Okmotys have provided a wide range of support to several CMWSs. For example, an active CDWUU Network can help strengthen its members' capacity by organizing training and workshops, as well as making them aware of opportunities like grants and helping them to access these. This is particularly true when led by a dynamic chair.

As noted in the introduction, women are the most affected by the presence or absence of clean drinking water. Initially, they have taken secondary roles in their CDWUU. However, one CDWUU in the study now has a female chair, and the two new CMWSs are led by female chairs. All three of them are performing better than the average CMWS and have good sustainability ratings.

Relationship between sustainability and long-term impact

There is a strong relationship between the sustainability of the CDWUU and its longer-term impact on village lives. The more sustainable CDWUUs are providing a better service and providing a more reliable supply of clean drinking water to a bigger proportion of people in their village than the less sustainable. Consequently, they are having a greater long-term impact on village lives, especially those of women and children. It makes women's lives less arduous, freeing them up to do other activities. It has a positive impact on the children's health.

Issues and challenges

Despite the largely positive results, there are some weaknesses and issues that need to be addressed. The financial viability of many of the CDWUUs is weak. While tariff collection rates are good in many CDWUUs, five are still below 60 per cent. Only two have other sources of income. Lack of reserves makes it difficult for CDWUUs to deal with major breakdowns in their WSS. The majority are behind in repayments of loans, taxes, and contributions to the Social Fund. Low CDWUU salaries means the provision of the water service is heavily dependent on the goodwill of staff. In the longer term, this could pose a serious threat to the sustainability of the WSS. In addition, too many CDWUUs still have difficulty drawing up their annual budget and calculating water rates and too many fail to review their water rates annually.

There is also evidence of poor performance of some CMWSs; three CDWUUs (25 per cent of the sample) are still providing a poor water service. They are not

serving all the village households, and in one case, not providing water to the village school. In addition, the supply of water is not always reliable. Relatedly, in four villages, households are using the water to irrigate gardens and for their livestock. This practice lowers water pressure and as a result, the supply of water in parts of these villages is erratic, and sometimes non-existent. There are also quality issues. Villagers in three out of the four WSS using springs and catchment sources complain that their water is sometimes dirty, especially after rain. Some households use this as an excuse not to pay their water bills. Only one CDWUU is chlorinating water regularly. The main reasons given are the cost and, in the case of those with boreholes, a wide belief that aquifer water is clean.

In terms of future-proofing services, the growth of villages, especially around lake Issyk-Kul, an important tourist attraction, is leading to increased demand for water which current WSS and CMWSs cannot always meet. In addition, some households have installed showers and bought washing machines and even flushing toilets. More are likely to do so in the future. This raises the issue of the disposal of 'grey' water and sewage.

Other matters of concern include that the constitution of the CDWUU has no provision for removing poorly performing chairs and that there is a lack of support from the Department of Rural Water Services (DRWS). Only one CMWS reported having any support from the government's DRWS. It is unclear whether this is due to the DRWS's limited resources or its attitude.

Relevance of findings to Kyrgyzstan's water and sanitation policies

Kyrgyzstan recently launched a new Sustainable Rural Water Supply and Sanitation Development Project 2017–2021 (World Bank, 2017). This takes on board some of the lessons of the earlier RWSSPs and the findings of this study. These include the recognition of the CDWUU as a partner with responsibility to operate, manage, and maintain rehabilitated WSS in rural villages; the need to support and strengthen CDWUU capacity; and the importance of involving women more.

However, the programme fails to address the importance of creating a strong sense of village ownership of its WSS and willingness to operate and manage itself. Without this, the sustainability and long-term impact of the CDWUU and WSS is likely to be jeopardized. The programme fails to state how much capacity building CDWUUs will get, or what it will cover. It does not say how it will encourage women to be more involved. Nor does it address one of the key issues highlighted in our findings, the weak financial viability of many CDWUUs.

Attribution and limitations of the study

While some of the sustainability and subsequent impact of the CMWSs can be attributed to the original RWSSP's Community-Based Approach, it has also been influenced by other factors. These include the capacity building and support provided since 2008 by local NGOs and the CDWUU Network, as well as assistance from Aiyl Okmoty. Several funders have also provided grants and loans for equipment, establishing the computerized billing system, and for water heaters.

This study is based on a relatively small sample and relied considerably on information provided by focus groups. Limited resources meant that it was not possible to conduct a large household survey. As a result, care needs to be taken in interpreting the findings.

Recommendations to improve sustainability and long-term impact of Community-Managed Water Supplies

Based on this study, the authors recommend that to improve the sustainability and long-term impact of CMWSs, policymakers and funders in Kyrgyzstan and other countries should give greater attention and devote more resources to involving the village community in the creation of its WSS and CMWS. They should use a Community-Based Approach to raise awareness, mobilize the village, and involve it in WSS planning and establishing its VWMO so as to maximize the village sense of ownership and responsibility to operate, maintain, and manage the WSS sustainably.

The CBA should also provide capacity building and support for the CMWS and continue to do this for two years after the completion of its WSS. When budgeting for new CMWSs, funders should include not only the physical costs, but also the costs of mobilizing the community and building its capacity to operate and maintain their WSS. This should allocate 20 per cent of the budget to the CBA component. They should not be seen just as an add-on but as a wise investment in the future sustainability and long-term impact of the CMWS.

Women should be encouraged to be actively involved in planning, creating, and, most importantly, managing their CMWSs. They should be encouraged to become chairs. One way, at least in Kyrgyzstan, is to get existing female chairs to share their experience with women in other villages. Also, more research is needed to identify the barriers preventing women from taking major roles and ways these can be overcome. Other institutional matters include ensuring the constitution of the VWMO includes a provision allowing an inactive and/or poorly performing chair to be removed. Without this, there is a real danger that the performance and sustainability of CMWSs will suffer.

Attention is needed to address one of the major CMWSs' problems identified by this study: their weak financial viability. Several steps can be taken to make them financially viable: allow them to register as non-profits and in so doing, reduce their costs and tax liability; encourage them to improve their water fee collection systems and review their water tariffs annually; and explore other sources of income.

In villages with metered household connections, the CMWS should charge a premium water fee rate on water used for non-household uses. This will discourage households from using drinking water to irrigate gardens and/or water animals. More broadly, steps should be taken to encourage CMWSs to build relations with a range of partners both inside and outside the village, as these can provide a wide range of support.

Moreover, more careful thought should be given to the consequences of upgrading of WSS and making adequate provision for dealing with them. The main ones likely to arise are handling more grey water and sewage. Relatedly, authorities should make

a provision to evaluate the sustainability of CMWSs five years after their completion. They should assess not only current sustainability, but also their likelihood to remain sustainable in the future. Findings should be taken into account when planning future policy.

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