WORLD BANK GROUP

CAEWDP
CENTRAL ASIA ENERGY-WATER DEVELOPMENT PROGRAM

Final Report
November 2015

The Case of UZBEKISTAN

Social Impact Analysis of Water Supply and Sanitation Services in Central Asia

1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

Cover photo/illustration: World Bank
Cover design: Jurczyk Design

This report was published with the support of the Central Asia Energy-Water Development Program (CAEWDP). CAEWDP is a knowledge and technical assistance multi-donor trust fund (MDTF) administered by the World Bank. CAEWDP's mission is to build energy and water security for the countries of Central Asia – Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan – through enhanced regional cooperation. Since its inception in 2010, CAEWDP has received support from bilateral and multilateral donors including the Government of Switzerland's State Secretariat for Economic Affairs (SECO), the European Commission (EC), the United Kingdom's Department for International Development (DFID), the United States Agency for International Development (USAID), and the World Bank Group. For more information, visit www.worldbank.org/eca/caewdp.

SOCIAL IMPACT ANALYSIS OF WATER SUPPLY AND SANITATION SERVICES IN CENTRAL ASIA

THE CASE OF UZBEKISTAN

Social, Urban, Rural and Resilience Global Practice
Water Global Practice
World Bank Group

Final Report
November 2015

WORLD BANK GROUP

CAEWDP
CENTRAL ASIA ENERGY-WATER DEVELOPMENT PROGRAM

CURRENCY UNITS

(As of June 30, 2014)

Currency Unit	Uzbek soum (UZS)
1 UZS	US$ 0.000435
US$ 1	2,296 UZS
US$ 100	229,600 UZS

ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
ECA	Europe & Central Asia
FGD	Focus Group Discussion
GoU	Government of Uzbekistan
HWT	Household Water Treatment
IDIs	Individual Interviews
JMP	Joint Monitoring Program
MDG	Millennium Development Goals
MICS	Multiple Indicator Cluster Survey
MSF	Medecins Sans Frontieres
O&M	Operation and Maintenance
OECD	Organization for Economic Cooperation & Development
PSIA	Poverty & Social Impact Assessment
PSP	Private Sector Participation
SIA	Social Impact Assessment
WASH	Water, sanitation and hygiene
WHO	World Health Organization
WSS	Water Supply & Sanitation
WTP	Willingness to Pay

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

This report draws on the contributions of many people in Uzbekistan who participated in the study. We would like to thank the around 150 drinking water and sanitation users and the 19 government and utility firm officials who shared their experiences and opinions with us either through focus group discussions or in-depth interviews. We are also grateful to the 300 respondents of the formal household survey.

This report was prepared under the coordination of Rob Swinkels and Pier Mantovani of the World Bank. The final report was written by Rob Swinkels, based on a draft report prepared by Bradley Hiller and Nils Junge. Bradley Hiller, Dikshya Thapa, Nils Junge and Ekaterina Romanova developed the research instruments and facilitated the training of the research team in Uzbekistan. Yoon Jung Lee produced the household asset index. Rinat Iskhakov provided support from the Uzbekistan Country Office. The report was produced under the overall guidance of Elisabeth Huybens, Sumila Gulyani and Dina Umali-Deininger together with Saroj Kumar Jha, Takuya Kamata and Junghun Cho. Logistical support was provided by Rumiya Garapova and Victoria Bruce-Goga. M. Ihsan Rajwad, Sarosh Sattar, Joao Pedro de Azevedo and Eskender Trushin provided helpful inputs. Primary data collection was conducted by Al Mar Consulting. Al Mar staff also provided input into sampling and the design of the research instruments.
Feedback on earlier drafts was received from the following reviewers: Julian Lampietti, Sarah Keener, Xavier Chauvot de Beauchene, Kirsten Hommann, Umrbek Allakulov, and Mark Woodward.

The team is grateful to officials from *Uzkommunkhizmat*, Ministry of Finance, the Ministry of Economy and the Ministry of Health for their comments on a consultation summary draft of this report and for their support to the completion of this study.

This study was financed by the Central Asia Energy and Water Development Program (CAEWDP). We are grateful for the support and also would like to thank Daryl Fields and Abena Akuffo-Akoto of the CAEWDP team.

SUMMARY

SUMMARY

BACKGROUND

1. **Available evidence suggests that Uzbekistan's water supply and sanitation (WSS) systems are performing poorly.** ADB (2012) for example estimates that less than half the national population has access to improved[1] drinking water and only 17 percent of urban households receive water 24 hours per day. The situation is worse in smaller cities and rural areas. Water resource protection is weak with only basic treatment facilities in place (JMP 2006, 2013). Sanitation coverage is low even in urban areas and according to some sources sanitation and hygiene (WASH)-related diseases or illnesses are a major concern (WHO 2012 & Pruss-Ustun et al. 2008).

2. **Reliable evidence on the *quality* of current WSS service conditions is scarce and consumer experience and views and voices are not systematically collected and used for policy development.** International experience suggests that poor drinking water and sanitation services can cause households to incur high costs for dealing with this situation. However, in Uzbekistan and other Central Asian countries, there is a lack of data on service quality and on coping costs. Together with limited feedback from consumers to those that design WSS policies and programs this makes it difficult to design effective reform measures and assess their ex-ante impact on households, in particular for those at the bottom of the income distribution.

3. **This study assesses consumer experiences with current WSS services across a range of selected sites in Uzbekistan and determines consumer readiness for reform.** First of all, the study analyses how surveyed consumers currently meet their drinking water and sanitation needs and what proportion of their household budget is spent on meeting their WSS needs. Second it assesses the interaction between consumers and service providers. Third it examines stakeholder views and positions on service modernization needs and assesses consumer willingness to pay for quality networked WSS services. Comparisons are made across consumers in a selection of cities, small towns and rural areas, between consumers that are connected to a networked service and those that are not, and between households in the bottom 40 percent and top 60 percent of the income distribution (as estimated through a wealth index).

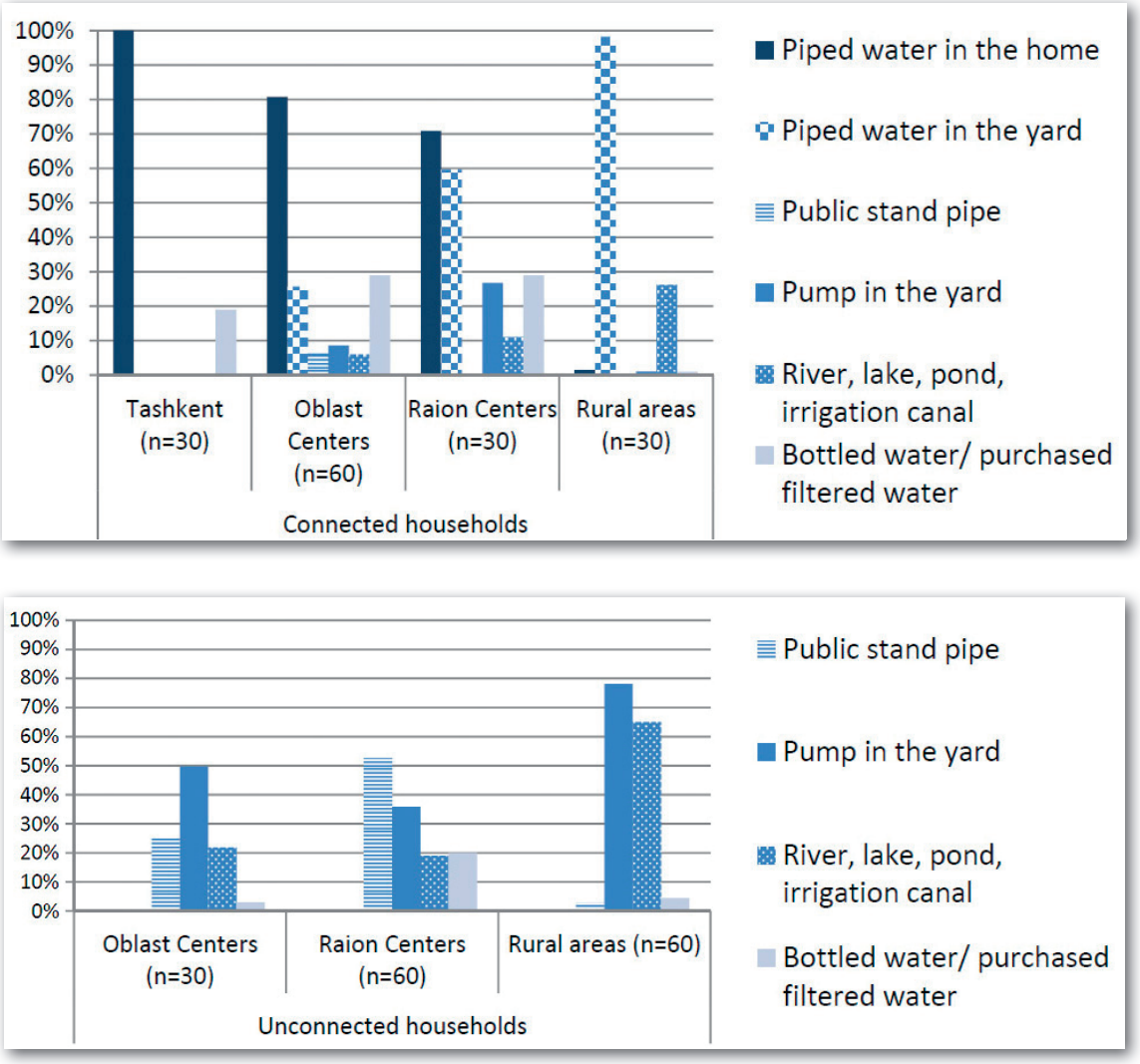
4. **Data were collected through both qualitative and quantitative research methods**. Qualitative data were collected through 19 in-depth interviews with service delivery stakeholders, 17 focus group discussions (FGDs) with consumers, and 10 mini case studies of households. Quantitative data were collected through a formal survey of 300 households. These were sampled from the capital Tashkent (30 households) and three geographically contrasting regions: one region in the west (South Karakalpakstan), one in the south (Jizzak) and one in the east (Fergana) of the country. In each of these regions 90 households were sampled, 30 in each of three location types: the Oblast (Region) center, the Raion (District) center and a rural area in the same district. In each site, households were randomly selected, stratified by whether they were connected to a WSS network or not. *Connected* means networked water is available *inside* the household property (home or yard). *Unconnected* means networked water is not available within the household property (either indoors or within a private yard) although it may have been available in the past.

ACCESS TO DRINKING WATER AND SANITATION SERVICES

5. **All surveyed households in Tashkent were *connected* and had taps inside their home. Twenty percent here also used bottled water. However, the situation was very different in the selected sites outside the capital where many more households use multiple sources of water.** Here, water pumps in the yard were important sources also for many *connected* households (Figure S1). In the selected rural areas most *connected* households use taps in their yards (97 percent), but also use pumps in the yard (27 percent) and rivers, lakes and ponds (26 percent). Key water sources for *unconnected* households in the selected Oblast centers were pumps in their yards (50 percent), public standpipes (25 percent), and rivers, lakes and ponds (22 percent). In Raion centers, the most common water source was piped water in the streets. In rural areas water pumps in the yard (77 percent) are the most common source for *unconnected* households followed by water from rivers, lakes and ponds (64 percent).

1 State Statistlcal Committee of Uzbekistan (2006) defines improved drinking water sources to include piped water into a dwelling, yard or plot, public tap or standpipe, a borehole or tube-well, a protected well, or a protected spring.

Figure S1. Proportion of all sampled households using a particular drinking water source



Source: Household survey conducted for this study (n=300)

Note: households outside Tashkent often use more than one water source and totals therefore add up to more than 100 percent; *connected* households for example use other water sources when no water is available from the networked piped system or the water quality is poor.

6. **Among the *connected* households in our sample important differences existed between households that are in the bottom 40 percent of the income distribution and those in the top 60 percent.** The proportion of *connected* households that relies on outside taps is much higher (38 percent) among the bottom 40 percent than among the top 60 percent in our sample (21 percent). In the selected Oblast centers 15 percent of *connected* households that are in the bottom 40 percent use irrigation canals as one of their main water sources, compared to only 3 percent of *connected* households in the top 60 percent of the income distribution. While slightly more than half (54 percent) of those that are *unconnected* to a WSS network belong to the bottom 40 percent of the income distribution the division is not clear cut and a sizeable proportion of the unconnected belong to the top 60% of the income distribution.

SUMMARY

DRINKING WATER AND SANITATION SERVICE CONDITIONS

7. **The proportion of surveyed households reporting problems with their drinking water service conditions varied enormously among the selected regions: from 27 percent of sampled households in Tashkent to 41 percent in Fergana, 48 percent in Jizzak and 78 percent in South Karakalpakstan.** In South Karakalpakstan these problems mostly concerned water for drinking, whereas in Tashkent (and other Oblast centers) households mostly complained about the quality of water that they use for taking a bath or shower.

8. **More than half (57 percent) of *connected* surveyed households using internal taps reported water quality problems.** The most widely reported problems were presence of particles / turbidity (41 percent) and high salinity levels (19 percent). Users of *unconnected* sources reported even more water quality problems. For households using water pumps, salinity and turbidity were the most frequently reported water quality issues[2].

9. **Surveyed *connected* households stated that water supply services often function only intermittently. This was said to be made worse by the unpredictability of interruptions.** Of all households in our survey sample that received piped water on their property, the proportion that receives a 24 hour service ranged from 90 percent in Tashkent to just 3 percent in rural areas. Three-quarters of connected household in our survey sample of 300 claimed they were never or only sometimes notified of major modifications to water supply schedules. Interviewed officials reported that some infrastructure is so old and degraded that isolating sections of conveyance or distribution infrastructure for maintenance and repair works is impossible. It should be noted that the Government of Uzbekistan - jointly with international donors - is undertaking a series of investments to rehabilitate and extend the water supply and sewerage system in the country.

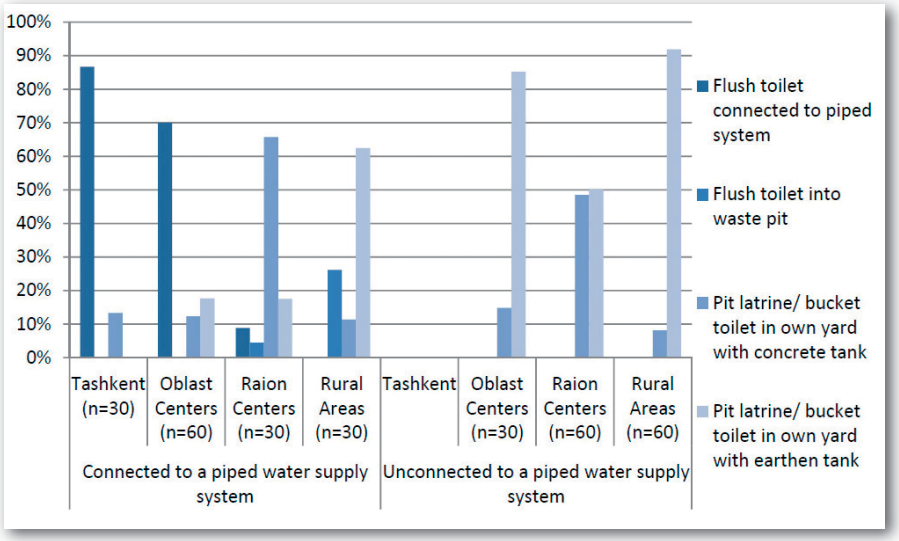
ACCESS TO SANITATION SERVICES

10. **Only one quarter of all households in our survey had access to a centralized sewerage system**. None of the households in our sample in Raion centers and rural areas had access to a sewerage network. This implies that most wastewater does not find its way into a central sewerage system and may be disposed directly into the environment without treatment.

11. **Only 20 percent of households in our sample had toilets located inside their home.** The vast majority of *connected* households in Raion centers had a pit latrine or bucket toilet with a concrete tank in their own yard. Most connected and unconnected households in the sampled rural areas had a pit latrine with an earthen tank (Figure S2).

2 Note that no tests to check the quality of water were conducted for this study.

Figure S2. Proportion of households in the survey sample using a particular type of toilet, by location, for those with and without connection to a piped water system



Source: Household survey conducted for this study(n=300)

12. **The proportion of *connected* households with a flush toilet connected to a piped sewerage system was much higher among those in the top 60 percent of the income distribution** (68 percent of this group had one), than among those in the bottom 40 percent (where 40 percent had this facility). Only 46 percent of surveyed *unconnected* households report always having water available at their sanitation facility.

13. **About a quarter of all surveyed respondents felt that WSS conditions had worsened over the past 5 years. Most noted no change over that period[3]. Fourteen percent had witnessed improvements.** Oblast centers had the greatest proportion of *connected* respondents who thought that their WSS conditions had worsened (40 percent).

INSTITUTIONAL FUNCTIONING

14. **Officials involved in water supply and sanitation that were interviewed for our study conveyed that Vodokanals (water utilities) often have severe debts and cannot even afford basic operating expenses for delivering their services.** This sometimes includes electricity debts, further exacerbating the problem of unreliable supply and poor service. They claimed that low tariffs and significant arrears of many customers, together with high operational costs, contribute to this situation. Pipes and pumps suffer from increased wear and tear, and shorter operating life, when power cuts are frequent and sudden. Vodokanals lack equipment to conduct even the most basic operational, maintenance and rehabilitation tasks, according to consumers and vodokanal staff participating in our study. It should be noted that, following government decision to that effect, water meters and modern billing systems are presently being installed to improve fee collection.

15. **Water utilities tend to be slow in responding to customer complaints, according to our survey data.** A quarter of *connected* households had a member who had contacted the vodokanal regarding a problem with water supply and sanitation. Of those, nearly half had received a response within a week, while one third had to wait longer than one month. Response times were generally weakest in rural areas (two thirds had to wait longer than one month). Problems remained completely unsolved in almost half the cases. Interviews and focus groups identified a lack of technical and human capacity in many vodokanals. Interviews with Vodokanal staff revealed that they struggle to attract and retain quality staff:

3 It should be noted that much of the degradation in the WSS systems may have occurred outside the 5 year timeframe asked in the survey. This may explain why the majority of respondents stated that no change had occurred during that period. Focus groups often suggested that conditions had been poor for a considerable period.

SUMMARY

"There's a vicious circle. As residents we say 'how wonderful it is to have cold water so cheap'. But, because of that, the water utility has no money and cannot replace pipes." - Tashkent connected Focus Group participant number 7

COPING MECHANISMS

16. **To cope with irregular water supply and pressure and quality problems, households have at least one additional source of water: 40 percent of all surveyed households use a secondary source on a regular basis and six percent use a tertiary source**. Survey data suggests that public taps can provide one of the few forms of 'improved' water sources for unconnected households, however, their flow rate can be low and unpredictable and they are often too few in number to cater to demand.

17. **Focus group discussions with unconnected households revealed that water from water pumps is a convenient source for many of them but often subject to quality concerns for potable use**. More than half (61 percent) of unconnected households using water pumps reported water quality problems. Focus group discussions and individual interviews revealed that consumers are aware that using open water sources, such as irrigation channels, rives and ponds for potable and household use is potentially unhygienic, but still use it when there are no other options.

18. **A range of different water quality problems were reported for all water sources**. Just under half (47 percent) of unconnected households using public water taps reported water quality problems – mostly particles/turbidity (43 percent), salinity (25 percent) and bad color (23 percent). Focus group participants reported that delivery of water via private companies/ vodokanals, taxi service or personal vehicle was not uncommon in Raion centers and rural areas. Survey results show that most households subject their water supply to some form of treatment prior to drinking and cooking.

19. **Poor residents have few alternatives and are often forced to use unhygienic sources of water such as irrigation canals and rivers or ponds, which can take more than half a day to collect in some areas** (including walking and carrying) and which typically have poor quality water according to participants in focus group discussions. In contrast, wealthier households may be able to afford relatively expensive alternative sources, such as bottled water and tanker delivered water. Fifteen percent of all networked households use bottled water, which may cost up to UZS 300 (0.13 US$) per liter, about 1,000 times more than vodokanal water.

HOUSEHOLD EXPENDITURES ON DRINKING WATER AND SANITATION

20. **The median, *unconnected* household in our sample in Oblast Centers and rural areas spent UZS 12,500 – UZS 13,500 (USD 5.20-5.60) per month on recurrent water expenditure. This is 60 percent more than the median *connected* household in Tashkent who spends UZS 8,000 (USD 3.30) per month**. According to our data, household water expenses are lowest in Tashkent even if service there appears to better than elsewhere. Unlike the other sampled areas, drinking water bills in Tashkent also include sanitation services.

21. **The share of recurrent monthly water expenditures as a proportion of total monthly household expenditure[4] was much lower among our sampled households in Tashkent (0.5 percent at the median) than in the selected Oblast center, Raion centers and rural areas (1.3 - 1.5 percent at the median).** Budget shares of recurrent drinking water and sanitation expenditure were higher for those in the bottom 40 percent of the income distribution (median of 1.5 percent) than the top 60 percent (1.1 percent). Focus groups in rural areas suggested that some households, due to the seasonal and sometimes in-kind nature of their incomes, have lower capacities to pay monthly utility bills.

22. **Focus group participants claimed that both connected and unconnected households incur *one-off* investment and *recurrent* costs in addition to costs for piped water/ bottled water to meet their WSS needs.** *One-off* costs were said to include, among others: (i) installation of water pumps at UZS 400,000-750,000 (USD 167- 312), depending on depth of the pump;

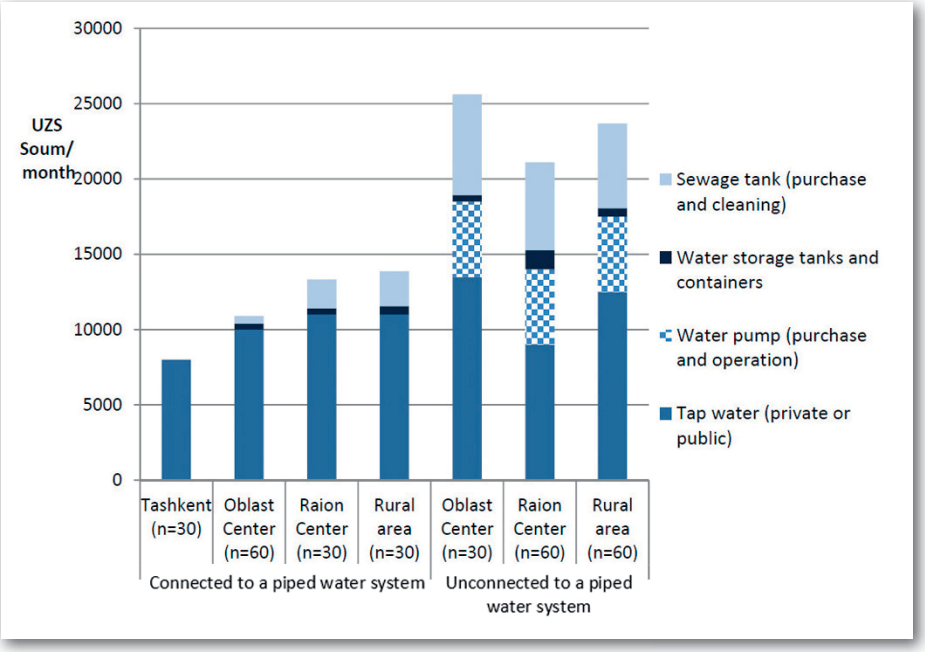
4 Estimated through household recall

(ii) installing a concrete septic tank for about UZS 300,000 (USD 125) (iii), buying plastic containers for collecting, transporting and storing water, reported to be UZS 30,000-40,000 (USD 12.50 to 16.70) and (iv) purchasing filters and paying for pipe repairs. Some households also reported high costs for operating their own WSS facilities. According to focus group respondents, such *recurrent* expenditures can include: annual cleaning of septic tanks at UZS 150,000 (USD 62); and payment for household delivery of water via tanker, taxi, etc. for up to UZS 15,000 (USD 6.20) for 500L in some areas.

23. **According to our survey data about half (49 percent) of unconnected households spent money installing their own sanitation systems, compared to 16 percent of connected households.** Furthermore, *unconnected* households also had much higher annual sanitation system operating costs (on average UZS 72,500 or USD 30.2) than the *connected* households paying tariffs for their sanitation service (UZS 18,900 or USD 7.9 per year).

24. **When we take into account *all* costs that surveyed households incur for meeting their WSS needs, households *not connected* to a piped drinking water supply system tend to incur much higher costs than those that are *connected* (Figure S3)**. Data collected through our focus group discussions and the household survey show that households in Tashkent incur only about one third (UZS 8000/ month) of the costs that unconnected households in Oblast centers or rural areas sustain (UZS 24,300-26,200). Median payments of surveyed households for piped water (private and public) varied between UZS 8,000 (Tashkent) and UZS 13,500 (unconnected households in Oblast centers). Connected households outside Tashkent incur additional costs for installation and operation of water pumps, water containers and installation and emptying of sewage tanks (only a minority of sampled households outside Tashkent are connected to sewage system). *Unconnected* households reported higher costs for installing and emptying sewage tanks than *connected* households.

Figure S3. Estimated total monthly costs of meeting drinki§ng water and sanitation needs (in Soum) per location and for households connected and unconnected to a piped water system to their dwelling



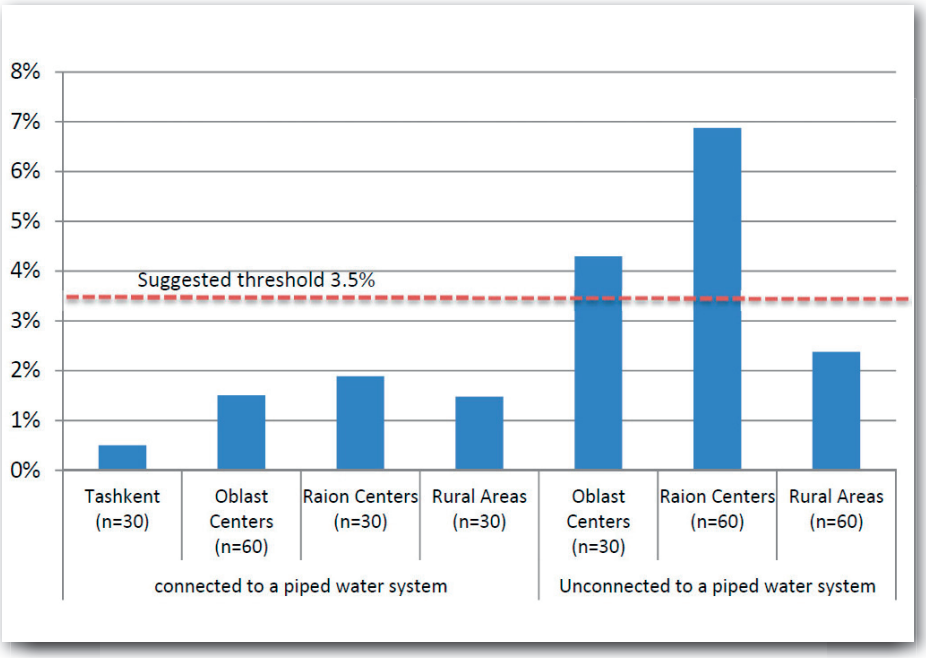
Source: Household survey conducted for this study (n=300)

Notes: Estimates are based on data from the household survey. Where survey data were incomplete, data collected through focus group discussions were used. Figures should be regarded as approximate. Tap water costs are based on survey medians. Water storage tanks: based on survey median (UZS 24,000); assumed to last for two years = UZS 1000 per month. Water pumps: installation cost UZS 500,000 UZS (based on focus group discussions) to install (costs vary based on depth of well and local soil conditions between 400,000 – 750,000UZS). Lifetime assumed to be 10 years. Operation cost assumed to be UZS 10,000 UZS/yr (for valves, piping, etc.). (500,000/(5*12)) +(10,000/12) = UZS 5000 per month. Sewage tank : installation cost is UZS 300,000 (based on data from focus group discussions). Assumed to last 15 years. 300,000/ (15*12) = UZS 1,670 per month. Cleaning costs: based on survey median per subgroup (varying between 5000 and 250 per month). Assumes all unconnected household have a concrete sewage pit in fact 95% of unconnected households have one. In rural areas and raion centers, almost

all of connected households have a sewage tank. Of all connected households, about half have a concrete sewerage pit, for this group we use the median survey data on 'sanitation costs'. Costs incurred for repairs of pipes and for building a toilet are excluded.

25. **The proportion of household budgets that is spent on meeting their drinking water and sanitation needs when all costs are included** can be twice as high for unconnected households than for those that are connected. The additional cost of water pumps and expenses for cleaning septic tanks can weigh heavily on household budgets for unconnected households in particular in Raion Centers and Oblast Centers where household expenditure on WSS needs are above the internationally suggested threshold of 3.5 percent (Figure S4). These data ignore the non-monetary costs households also incur such as time lost due to illness, taking care if sick children, or queuing for water.

Figure S4. Median proportion of household expenditure spent on meeting drinking water and sanitation needs (in percentage) per location and for households connected and unconnected to a piped water system to their dwelling



Source: Household survey conducted for this study (n=300)

Note: Data are approximate. Included are tap water costs, cost of buying water containers, costs of water pumps, and costs of cleaning septic tanks Estimates are based on data from the household survey. Where survey data were incomplete, data collected through focus group discussions were used. Figures should be regarded as approximate. Tap water costs are based on survey medians. Water containers costs are taken from the household survey. Water pumps: installation costs are UZS 500,000 UZS (based on focus group discussions) (costs vary based on depth of well and local soil conditions between 400,000 – 750,000UZS). Lifetime assumed to be 10 years. Operation cost assumed to be UZS 10,000 UZS/yr (for valves, piping, etc.). (500,000/(5*12)) + (10,000/12) = UZS 5000 per month. Sanitation costs are taken from the household survey.

METERING

***26. Connected* households that have a water meter pay less (UZS 6000 at the median) than households that pay their bill based on normative pricing (UZS 10,000) according to our survey data.** Sixty-one percent of households state their bills are calculated on a normative basis (based on the number of people in the household) and only 39 percent say their consumption is measured through a water meter. Even in Tashkent only 40 percent of households in our sample had a meter. Focus groups suggest that many households believe meters constitute a fairer billing system. Given the inconsistent and unpredictable supply of water, many said they are happier with meters because they only pay for water when it is available and being consumed[5].

5 It should be noted that the government of Uzbekistan has raised the coefficient used for determining the fees of non-metered connections to promote the installation of water meters by customers. Cabinet of Ministers Resolution of the Republic of Uzbekistan, №300 dated November 6, 2013, and №337 dated November 6, 2012.

27. **Focus group discussions with consumers revealed there is some confusion about the potential cost-savings associated with metering methods. The majority (almost two thirds) of surveyed households with normative water billing did not want to change to a metered system.** Focus groups and interviews suggest that connected consumers with non-volumetric billing attempt to get all the water they can from the distribution system as there is no additional cost associated with extra consumption. This was said in turn to lead to utilities rationing water and providing fewer hours of service. Additionally, consumers are not always clear about how the billing works and suspect over-charging. Normative billing provides little incentive for vodokanals to improve their service, as consumers are charged the same bill even if no water is supplied.

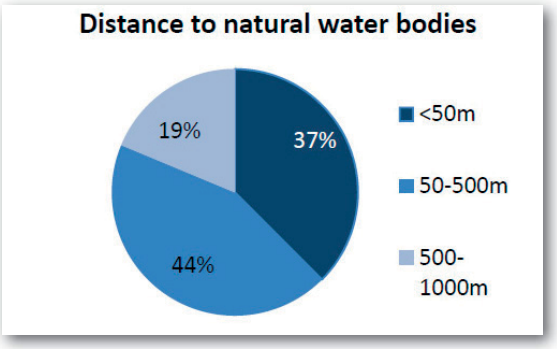
28. **Despite low tariffs, vodokanals, neighborhood (mahalla) committees report an increasing trend in non-payment and arrears. Failure to pay is linked to the inability or unwillingness by utility companies to levy penalties or cut off water to households or agencies that do not pay.** Sixteen percent of networked survey respondents had not paid for water in the last 12 months for either 'no specific reason' (11 percent) or because they could not afford it (5 percent). A mahalla committee chairwoman in Fergana Oblast center, estimates that 40 percent of households in her mahalla are in arrears for water utility payments. Perceptions from multiple focus group participants were that lower income residents generally paid bills on time, while higher income residents tend to be more reluctant to pay and, if they do, they often delay.

29. **Focus group participants and interviewees report disagreements between residents and the vodokanal in cases where residents are required to pay for access to public taps**. For example, in the selected Raion center in Jizzak, consumers are charged 1,000 UZS per person per month by the water utility, even though households have no connection to the water network and the only source is a public water tap four streets away. Often focus group participants claimed they are not aware what rate they should be paying to the vodokanal for access to the public water taps. Furthermore, focus group participants reported that despite paying the fees for accessing public water taps, residents often take on the maintenance and repair of such systems in the absence of vodokanal efforts.

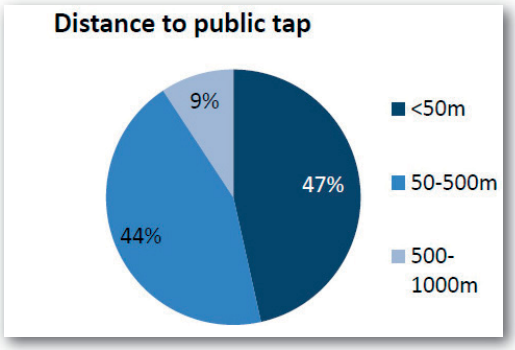
NON-MONETARY COSTS

30. **Focus group participants conveyed that water collection and treatment at home can impose a significant burden of time and effort for both *connected* and *unconnected* households**. According to our survey data households that rely on natural water bodies (about a quarter of all household and 70% of the bottom 40 percent in rural areas) and public water taps (half of households in Raion centers) generally transport water over the greatest distances. Almost one fifth of those for whom water from ponds and rivers is an important source travel 500-1,000m each way. And more than half of users of public taps live 50-1,000m away from them (Figure S5).

Figure S5 Distance to ponds, rivers and lakes and to public taps for those that rely on this source for at last part of their needs.



n=43



n=32

Source: Household survey conducted for this study n=300.

In some areas, time spent on water collection can impose significant opportunity costs on household members. In Jizzak, focus group participants for example stated that, on average, they spent 6 hours per day walking 2 km to the public tap outlet, waiting in line, and then walking back with full containers.

31. **16 percent of surveyed *unconnected* households and 9 percent of surveyed *connected* households claimed to have suffered negative health impacts because of poor WSS conditions.** Among these, more than half mentioned gastrointestinal diseases, almost a quarter urinogenital - kidney stone diseases. Group discussions held in Nukus, South Karakalpakstan, in particular mentioned kidney stones and salt deposits in the joints purportedly due to drinking poor quality water. Medical bills for illnesses and diseases attributed to WSS conditions can be significant. Incomes are lost due to illness or caring for ill household members, which especially affects women. Adult females overwhelmingly bear the burden of household chores connected with water use. Many women in focus groups report lower back pain from repetitive lifting and moving heavy containers.

32. **Poor wastewater management including leaking sewage pipes, consitute a serious health risks, according to focus group participants.** Unattended sewage leaks were said to lead to sewage pooling on the surface, as well as infiltration of sewage into local groundwater systems that are used for drinking water. Particularly during summer, it was reported that there are many insects around pit latrines, which can breed and spread infection.

33. **A fifth of surveyed women feel unsafe using the sanitation facilities available to them.** Focus groups suggest that in cases where toilet facilities are located in public areas (some households in our survey sample in raion centers in Jizzak and Fergana use such facilities), there are increased safety / security concerns relative to private toilets. On average, public toilets are located at a distance of 30-60 meters from the house, but there are also some households for which the toilets are located at a distance of 500 meters.

34. **Nearly a quarter (23 percent) of connected households surveyed had witnessed local conflicts regarding WSS issues**. Most disputes concerned problems with WSS service delivery (77 percent), quality of service from vodokanal (71 percent) and poor infrastructure / facilities (62 percent). Disputes over payments were insignificant (3 percent). Consumers also reported that queuing for water at public sources can be a source of tension, particularly when queues can reach up to 150 people. Some focus groups attribute reductions in water pressure in some networked systems to illegal connections. Vodokanal staff reported conducting random inspections to monitor appropriate use of networked water (especially related to garden watering) and levying fines. Public buildings often face water supply and sewerage challenges similar to households. In some areas, water sources are located outside public buildings and toilet facilities are often without running water[6].

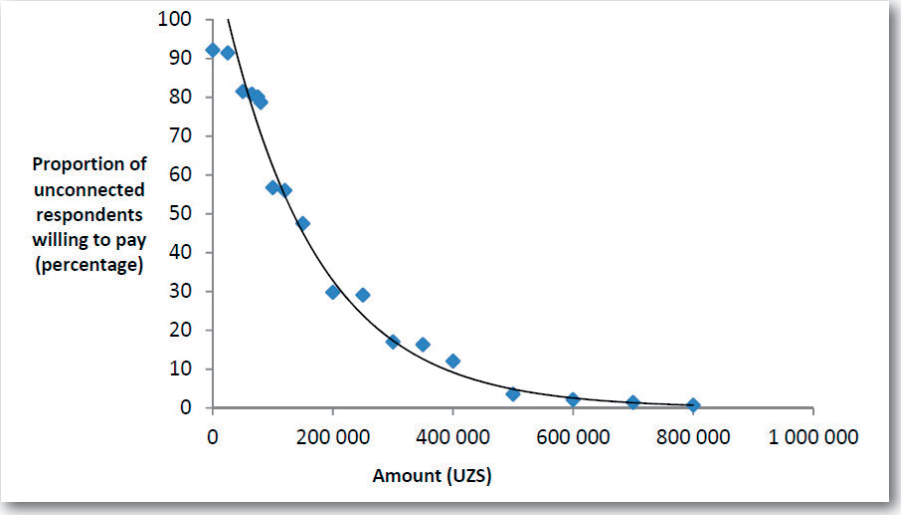
35. **A number of focus groups provide evidence of communities getting together to address the poor WSS service conditions by vodokanals sometimes in conjunction with private persons or entrepreneurs.** In some cases communities initiated and constructed local infrastructure in conjunction with private sector parties. One entrepreneur had paid for the laying of 500 meters of pipework to improve water supply conditions. Some small-scale entrepreneurs are selling purified water that is of better quality than what comes from the tap or pumps. These entrepreneurs sell water in public areas. In one Raion center residents are trying to restore water sources (wells) to provide public tap access. Focus groups report that in the Fergana Raion center, 87 household residents – without permission from the vodokanal – extended the network from the public taps to connect water to their premises.

WILLINGNESS TO PAY FOR IMPROVED SERVICES

36. **Nearly all unconnected households (86 percent) in our sample reported they were willing to pay *for a connection* to a high quality water supply and sanitation system that provides good quality piped water in sufficient amounts for 24 hours per day.** Surveyed consumers are already demonstrating their willingness to improve their WSS situation via various independently initiated improvements, as revealed in the focus group discussions. The median amount they were willing to pay is UZS 200,000 (USD 83) (Figure S6). The median among those in bottom 40 percent of the income distribution was UZS 100,000 compared to UZS 200,000 for the top 60 percent. On average, households were willing to pay 2.7 percent of their total annual household expenditure to connect to a well-functioning WSS service.

6 ADB (2014) found that public buildings, such as clinics and schools, often rely on public standpipes that suffer frequent service interruptions.

Figure S6. Demand curve for *connection to* a well-functioning WSS system, showing the proportion of households that are willing to pay a particular amount as a one-off investment for being connected.



Source: Household survey conducted for this study (n=147)

Note: households were asked: 'suppose that it would be possible to supply good quality piped water 24 hours per day in sufficient amounts to meet all your drinking, service and sanitation needs, so that you would not have to use any other water sources, how much would you be willing to pay to be connected to such a system'. Answers were obtained from 147 respondents.

37. **Consumers surveyed for this study were asked how much they were willing to pay as a *recurrent fee per month* for a high quality drinking water and sanitation service. Nearly half (42%) indicated they would be prepared to pay UZS 15,000 per month, and about a quarter said they are ready to pay UZS 20,000 (Table S1).** This is somewhat higher than the amounts most households are currently paying for piped water and sanitation, but lower than the actual costs they are incurring now to meet their WSS needs (such as water pumps, costs for emptying septic tanks, etc (Table S1).

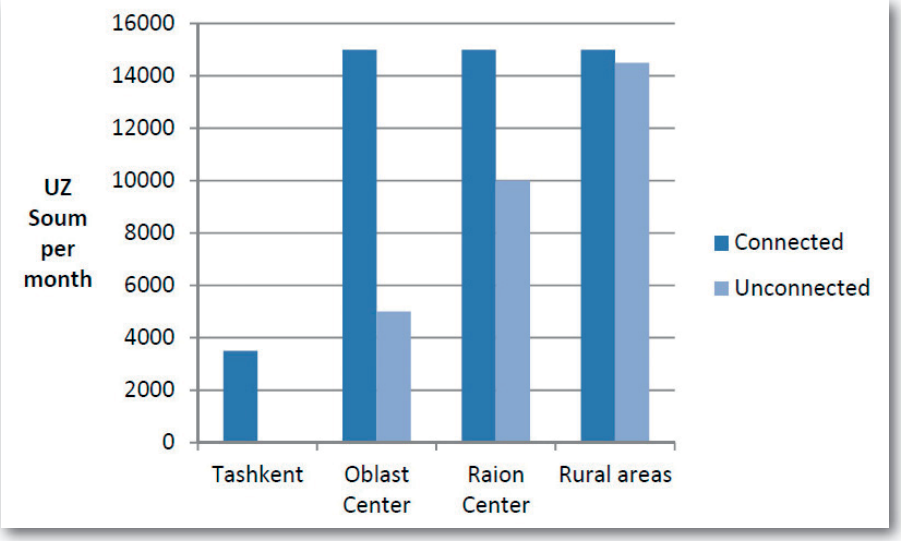
Table S1. Willingness to pay for a recurrent *monthly fee* for a high quality WSS service in UZ soum per month, connected and unconnected households combined.

Amount (UZS) per month	Percentage of respondents willing to pay amount per month (%)
2,000	100
5,000	86
10,000	67
15,000	42
20,000	24
25,000	12
30,000	5
40,000	2

Source : household survey conducted for this study (n=147).

38. **Willingness to pay was highest among unconnected households in rural areas (UZS 14,000 per month) and lowest in Tashkent (UZS 3,500) (Figure S7).** As our data suggest, unconnected households in rural areas currently rely for a large part on poor quality river and pond water. They may therefore be keenest to obtain "Tashkent" quality of WSS services. Currently, according to our data, unconnected households are incurring more than UZS 20,000 per month for meeting their WSS service needs.

Figure S7. Median willingness to pay for high quality WSS services in UZ soum per month per location and for connected and unconnected households



Source : household survey conducted for this study (n=147)

39. **Focus group participants in some areas agreed that tariffs are low but they are unhappy with rising tariffs and are not willing to pay more when the quality of service from the vodokanal is so poor**. Other focus group participants acknowledged that there is a vicious cycle of low tariffs leading to insufficient means for water utilities to maintain and upgrade WSS networks which in turn leads to poor service.

RECOMMENDATIONS

40. **Installing water meters** for consumers is a priority as it is likely to reduce wasteful consumption and thus help avert problems with low pressure, especially in summer. It will also provide incentives for vodokanals to improve their service, as consumers will only pay for the water they actually receive and consume. Our findings suggest that in many cases it will also reduce household water bills. At the same time it is important to improve communications on the benefits of metering and also to simplify bills to make it clearer for consumers what they pay for. Equal treatment of all households in the enforcement of payment of bills should receive more attention. The study findings also indicate that rules around payment for public taps should be clarified to make sure that only households that are likely to make use of these taps are charged.

41. **Better informing consumers in time about interruptions.** To address the unpredictability of supply through piped drinking water systems, there is a need for drinking water utilities to inform consumers in time about the water supply schedule and when interruptions can be expected. This is especially important for public taps as many households not connected to a supply system reply on this source, especially those in the bottom 40 percent of the income distribution.

42. **Utilities should become more responsive to consumer complaints.** It is important that the drinking water and sanitation utilities firms become more responsive to consumer complaints about broken WSS infrastructure. Resources including staff should be made available for this. Alternatively, consumers and Mahalla's – sometimes together with private entrepreneurs - currently conducting their own repairs on WSS systems, should be provided with technical supervision by the utilities firms. Basic equipment should be provided. Regulations that facilitate the engagement of private parties in repairs of WSS infrastructure should be prepared.

43. **Investigate and address serious drinking water quality problems where these are reported.** Information gathered from many consumers for this study suggest that there are severe water quality problems from piped systems and from pumped groundwater outside Tashkent. This suggests that mechanisms for consumers to complain about water quality should be improved and that more regular and widespread quality tests of piped water and ground water should be conducted to

investigate causes of contamination. Findings also suggest that regulations for preventing contamination of ground water by pit latrines should be strengthened and enforced.

44. **Improve functioning of public taps** and make their billing systems more transparent. Public taps are an important source of drinking water for those that are not connected to a properly functioning water supply system and cannot afford bottled water. Many of them rely on rivers and lakes if public taps break down or are absent. Therefore, priority should be given to improving the functioning of public taps and ensure its water meets quality standards and its supply is reliable.

45. **Reconsider the currently frozen tariff structure.** The study finds that those households who receive the best WSS services (e.g. Tashkent residents) currently incur WSS costs that are much lower than those that receive the worst conditions. Respondents of our study indicated a willingness to pay higher monthly fees than they currently do, on the condition that services improve. There is also a strong willingness to pay by many households - that currently incur high coping costs for meeting their WSS needs - to connect to a well-functioning WSS system. Our findings suggest that there are opportunities to reconsider the currently frozen tariff structure. A mechanism should be considered that raises fees for those that currently receive high quality water and re-allocates these resources to provide services to those areas where households currently incur high private costs for meeting their WSS needs.

46. **Protect those that cannot afford higher fees**. While there are strong indications that households are willing to pay higher WSS fees provided WSS service conditions improve, our findings also suggest that some households may not be able to pay higher fees. Any effort to raise fees for high quality WSS services should therefore go hand in hand with well-targeted social transfers to those that may not be able to afford those.

47. **Strengthen feedback from WSS consumers** to national and sub-national WSS decision makers and program providers. In order to design programs and policies that are based on the reality of conditions in the field, it is important to put in place a high quality feedback mechanism that collects information from consumers on their experiences and WSS service quality conditions. To re-design WSS tariff policies it is also essential to put in place regular high quality household expenditure surveys. This would help establish a database of household consumption expenditures as well as expenditures on meeting WSS service needs (and possibly other utility costs). This is also essential for assessing the impacts of any change in WSS tariffs on different wealth groups. Such nationwide household surveys would also help confirm the findings from this study.

INTRODUCTION

1.

1. INTRODUCTION

BACKGROUND

48. **Available evidence suggests that Uzbekistan's water supply and sanitation (WSS) systems are performing poorly.** The Asian Development Bank (ADB) (2012) estimates that less than half the national population has access to improved[7] drinking water and only 17 percent of urban households receive water 24 hours per day. The situation is worse in smaller cities and rural areas (*ibid.*). Water resource protection is weak with only basic treatment facilities in place (WHO/UNICEF 2006, 2013). Sanitation coverage is low even in urban areas and the World Health Organization (WHO) states that the percentage of deaths attributable to water, sanitation and hygiene (WASH)-related disease or illness is greater than 15 percent (WHO 2012 & Pruss-Ustun et al. 2008). Like other Central Asian countries, Uzbekistan today is not on track to meet the Millennium Development Goals (MDGs) related to drinking water and sanitation (OECD 2011).

49. **The situation on the ground is however poorly understood as reliable evidence on current WSS service conditions is scarce and consumer experience and views are not systematically collected and used for policy development.** Less than half the population is connected to a piped water system (Table 1) and there are serious concerns regarding continuity and quality of networked water supply services. International experience suggests that poor WSS services can cause households to incur high coping costs for meeting their drinking water and sanitation needs. This particularly affects vulnerable households. The lack of data on service quality and household coping costs together with limited feedback from consumers to service providers is problematic. It makes it difficult to develop WSS programs based on reliable evidence from the field. It also makes it hard for those in charge of WSS policy development to design effective reform measures and assess their ex-ante impact on different groups of households such as those at the bottom of the income distribution.

Table 1. Access to piped water supply in three Central Asian countries in 2012

	GDP $/per capita	Urban pop. %	Access to Piped Water Supply		
			Urban	Rural	**Total**
Tajikistan	780	27	87	34	**48**
Kyrgyz Republic	900	35	87	36	**54**
Uzbekistan	1,500	51	85	26	**47**

Source: UNICEF/WHO. Progress on Sanitation and Drinking Water. JMP Report 2013

50. **Highly degraded infrastructure and high operating costs, together with low tariffs, inefficient fee collection and only partial decentralization of WSS utilities, have led to poor cost recovery and low quality of service delivery.** WSS infrastructure is largely inherited from the Soviet era and has subsequently deteriorated over time. Some infrastructure components are approximately half a century old. The sector has been unable to face existing and looming challenges associated with aging assets, economic and demographic growth, climate change and social expectations. Since independence in 1991, municipal services have been largely decentralized to local governments. WSS policies, such as issues related to water tariffs, however, have remained the mandate of the central government. At the municipal level the water utility company (*vodokanal*) is responsible for the supply of drinking water to the public, and may also manage sewage systems. Typically, vodokanals interact with consumers via the mahalla committees and Home Owner Associations. See Annex A for a map of stakeholders and their roles in the WSS sector in Uzbekistan and Box E1 in Annex E for a description of the soviet legacy.

51. **In response to this problematic situation, the Government of Uzbekistan (GoU) and its development partners have committed to improving living standards and enhancing WSS services**. The GoU endorsed the 2000 'Almaty Guiding Principles for Reform of WSS in New Independent States' to reverse the deterioration of WSS services (OECD 2011) and aims to increase coverage of centralized services to consumers via a National Welfare Improvement Strategy (2012-2015) and a National Water Supply and Wastewater System Development and Modernization Plan (2009-2020) (ADB 2014). Likewise, a Presidential decree on infrastructure construction for 2011–2015 includes an objective to supply all urban and rural water consumers with meters (GoU 2010). The World Bank and other development organizations have provided substantial assistance to rehabilitate and expand WSS networks in Uzbekistan since the early 1990's. However, efforts and investments to date have not been sufficient to comprehensively reverse the chronic degradation of the sector. At the same time, there have been signs of a renewed readiness

7 SSCUZ (2006) defines 'improved drinking water sources' to include piped water into a dwelling, yard or plot, public tap or standpipe, a borehole or tube-well, a protected well, or a protected spring.

from the GoU to prepare a new WSS sector strategy for a more sustainable improvement of the WSS situation, in partnership with international financial institutes and other donors. This report was prepared in order to inform such a new strategy and underpin it with evidence regarding the situation 'on the ground'.

OBJECTIVES

52. **The objective of this technical assistance is to promote the engagement of consumers and the use of evidence in developing policies and plans for equitable access to WSS services in Uzbekistan**[8]. The objective is to be achieved by: (1) conducting, with relevant stakeholders, an assessment of consumer perceptions and social impacts of current WSS service access and quality; and (2) strengthening the capacity of country counterparts in applying Social Impact Analysis (SIA) for policy and program design. Findings will be discussed with GoU counterparts and where possible discussion workshops will be held with stakeholders and those involved in preparing the country's WSS strategy.

53. **The assessment aims to help identify areas for reform, building a strong consumer evidence base, with the following working hypotheses:** i) significant economic and social costs are being incurred due to poor WSS services and ii) customers are dissatisfied with current service quality levels and are ready and willing to pay significantly higher fees for better networked service.

METHODOLOGY

54. **The (P)SIA applied in this study is an approach for an ex-ante- assessment of the social impact of social service conditions and policy reform on households with a particularly emphasis on the most vulnerable ones.** It takes the perspective of household consumers and promotes greater use of evidence from the field in policy making. The evidence is gathered through the collection of quantitative and qualitative data from customers of these social services as well as from service providers and utility firms. These data are then used to assess how the impact of service conditions or service reform is distributed across households in different social and geographic groups. The identification of mitigation measures for protecting the most vulnerable from negative social impacts of reform is often part of the assessment.

55. **International experience with the (P)SIA approach has demonstrated it can be useful for bringing evidence from the field into discussions around the design and implementation of reforms in a range of sectors.** For more than a decade, (P)SIAs have been used to assess utility reform impacts in the Europe and Central Asia (ECA) region and elsewhere. In situations where data are scarce or unreliable, the approach can be instrumental in bringing fresh evidence to bear on policy making.

56. **The PSIA approach can be applied through a number of different quantitative and qualitative research tools**. This includes distributional analysis to assess what population groups benefit from delivering social services below the costs that utility providers incur to deliver them, and how this will change when such (implicit) subsidies are reduced. Qualitative data collection such as through focus group discussions to assess consumer experiences with service conditions and gather their views on policy reform options are also frequently used. By engaging stakeholders in the analysis, a (P)SIA can help to establish a platform for the engagement of utility consumers in evidence-based discussions around developing equitable policies that enable the provision of affordable quality utility services to all population groups across the country.

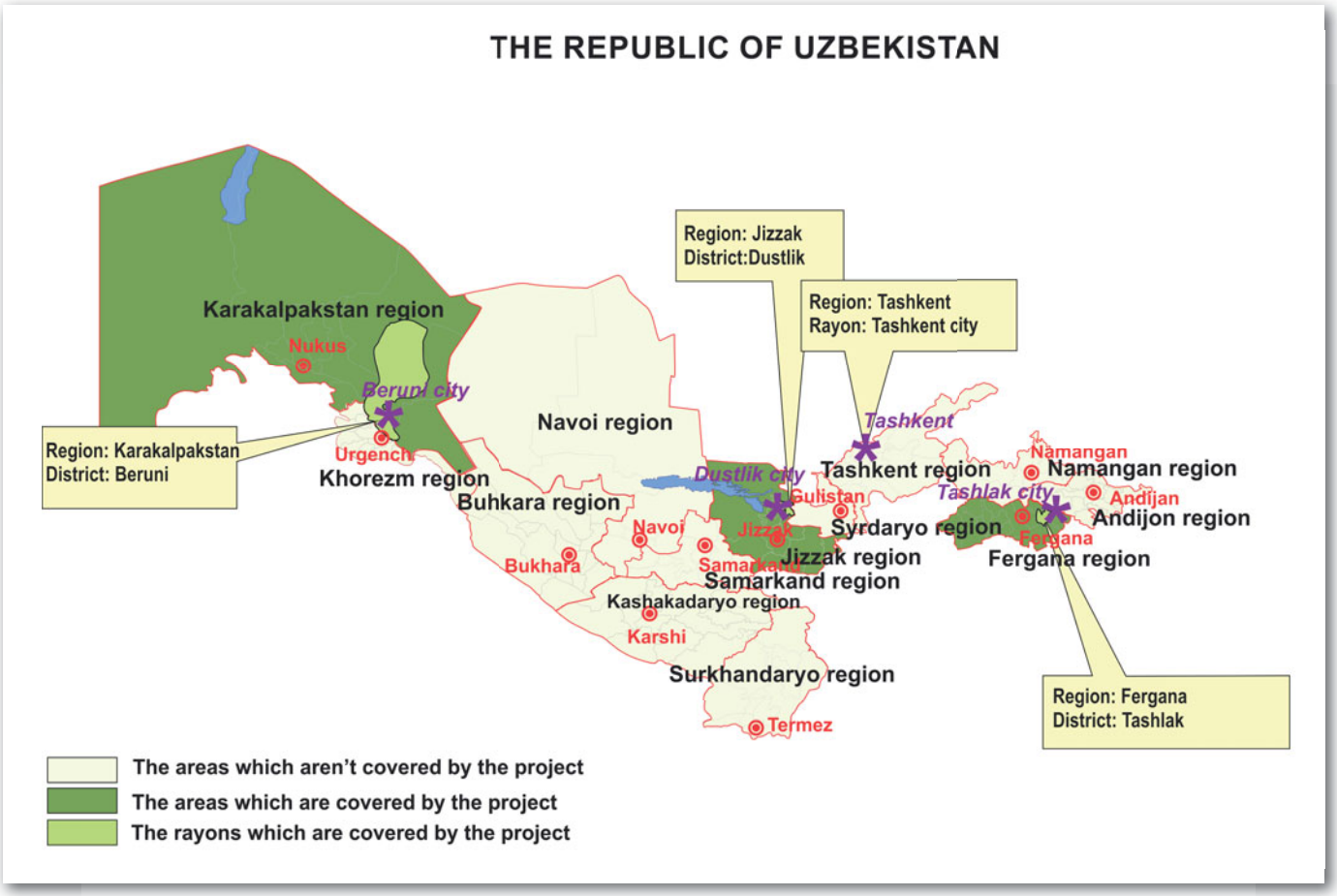
57. **This study assesses consumer experiences with current drinking water and sanitation WSS services across a range of selected sites in Uzbekistan and determines consumer readiness for reform.** First of all, the study analyses how surveyed consumers currently meet their drinking water and sanitation needs and what proportion of their household budget is spent on meeting those needs. Second, it assesses the interaction between consumers and service providers. Finally, it examines stakeholder views and positions on service modernization needs and assesses consumer willingness to pay for quality networked WSS services.

8 This work is part of a larger regional initiative and is expected to also cover Tajikistan and the Kyrgyz Republic.

1. INTRODUCTION

58. **Comparisons are made across consumers in a selection of cities, small towns and rural areas** (see Figure 1), between consumers that are connected to a networked service and those that are not, and between households in the bottom 40 percent and top 60 percent of the income distribution (as estimated through a household asset wealth index – See Annex G).

Figure 1. Study sample sites in Tashkent, South Karakalpakstan, Jizzak and Fergana



59. **Data were collected through both qualitative and quantitative research methods from a range of contrasting sites**. Qualitative data were collected through 19 in-depth interviews with service delivery stakeholders, 17 focus group discussions (FGDs) with consumers, and 10 household case studies. Quantitative data were collected through a formal survey of 300 households. Because of resource constraints, the sample is relatively small and the survey is not probabilistic. Data are not statistically representative for Uzbekistan as a whole. Instead, the sampling methodology was 'purposive'[9], and included ten sites that represent a range of geographical areas and types of locations in Uzbekistan.

60. **Households were sampled from the capital Tashkent (30 households) and three geographically contrasting regions: one region in the west (South Karakalpakstan), one in the south (Jizzak) and one in the east (Fergana) of the country** (see Figure 1). In each of these regions 90 households were sampled, with 30 of them randomly selected in each of three location types: the Oblast (Province or Region) center, the Raion (District) center and a rural area in the same district. In each site, households were randomly selected, stratified by whether they were connected[10] to a WSS network or not. For the purposes of our analysis, *connected* implies networked water is available inside the household property (either indoors or within a private

9 Purposive selection of primary sampling units but random household selection within those primary sampling units. Effort was made to include a diverse cross-section of Uzbekistan households.
10 Stratification by connected and unconnected households was used in all geographical regions, except Tashkent where only connected households were surveyed.

yard), whereas '*unconnected*' means networked water is *not* available *within the household property* although it may have been available in the past. *Connected* households can also use other water sources than water from the WSS network. The stratification into connected and unconnected households approximates proportional sampling on average in these areas given that about half of households in Uzbekistan are connected to a piped water system (WHO/UNICEF 2006). Field work took place between April and June 2014. For a more comprehensive outline of the study methodology, see Annex B.

Photo 1. Example of a focus group discussion, Beruni district, Karakalpakstan

61. **The rest of the report is structured as follows**. Chapter 2 presents the study findings regarding household access to drinking and sanitation services and also discusses the functioning of current institutional arrangements, based on the field data. Chapter 3 then provides an overview of household mechanisms for dealing with poor service conditions. Household monetary and non-monetary expenditures for meeting their WSS needs are presented in Chapter 4, followed by a brief discussion of household willingness to pay for improved networked service conditions in chapter 5. Chapter 6 then discusses WSS conditions in public buildings. This is followed by Chapter 7 which concludes and provides recommendations.

ACCESS TO DRINKING WATER AND SANITATION SERVICES

2.

2. ACCESS TO DRINKING WATER AND SANITATION SERVICES

62. In this chapter we present the study findings regarding the sources of drinking water that different groups of households use, as well as the conditions of these sources. This is followed by a presentation of the types of sanitation services used by surveyed households and a brief discussion of the findings regarding the functioning of the institutional arrangements for delivering drinking water and sanitation services in our sampled sites.

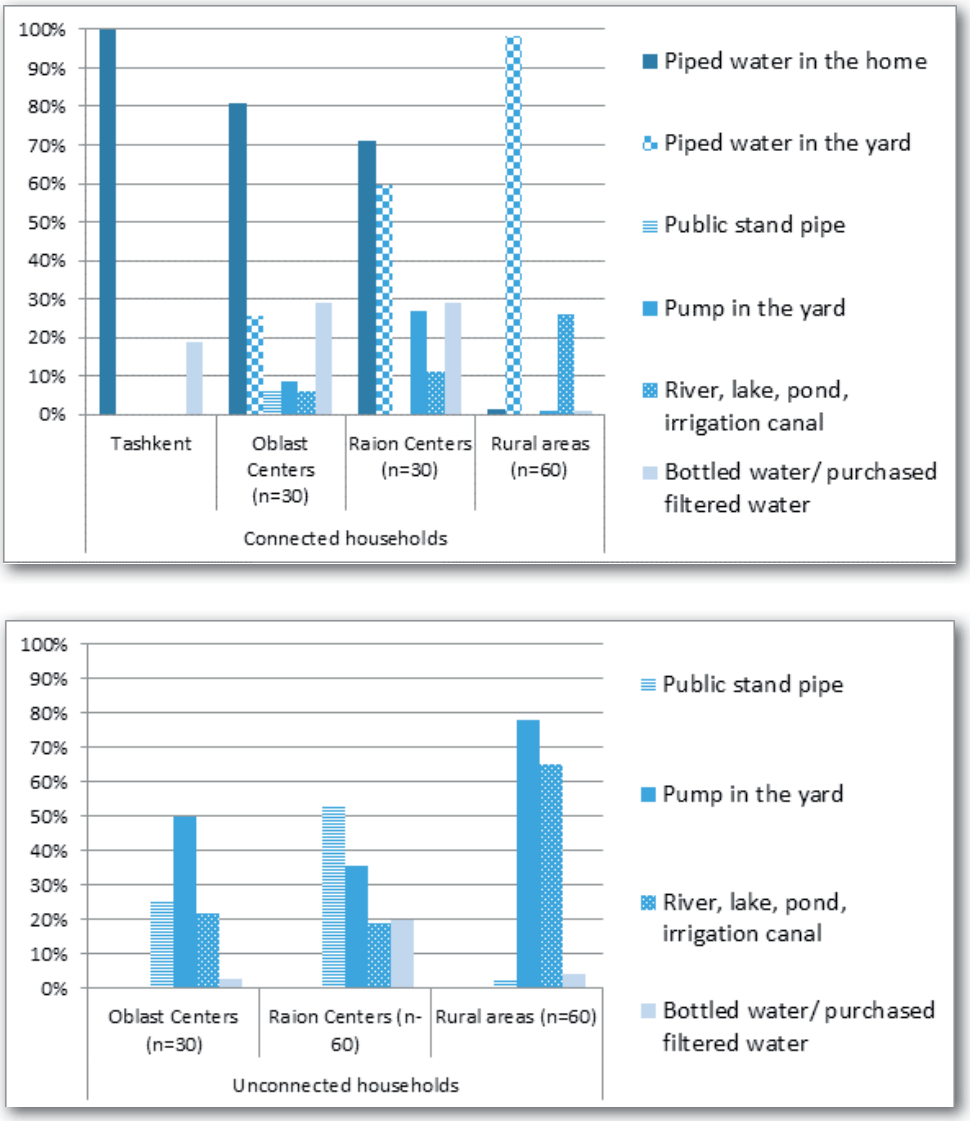
SOURCES OF DRINKING WATER

63. **All surveyed households in Tashkent were *connected* and had internal taps as their main water source. However, these figures were much lower for surveyed *connected* households outside the capital.** Here many households used multiple sources of water. Outside taps in the yard and water pumps in the yard (usually hand pumps) were important sources for many *connected* households outside the capital (Figure 1). In the selected rural areas most *connected* households rely on outside taps (97 percent reported using these), but many *also* use water pumps in the yard (27 percent) and rivers, lakes and ponds (26 percent).

64. Key water sources for *unconnected* households in Oblast centers were water pumps (mostly hand pumps) in their yards (50 percent of this group stated they use this source), public standpipes (25 percent), and rivers, lakes and ponds (22 percent). In Raion centers, the most common water source for *unconnected* households was piped water in the streets. In *unconnected* rural areas water pumps in the yard (77 percent) are the most common source, followed by water from rivers, lakes and ponds (64 percent). See Figure 1. As mentioned totals add up to more than 100 percent as many households have more than one source of drinking water.

Photo 2. Fergana city was one of the best networked supplies surveyed outside Tashkent.

Figure 1. Proportion of all sampled households using a particular drinking water source



Source: Household survey conducted for this study (n=300)

Note: households outside Tashkent often use more than one water source and totals therefore add up to more than 100 percent; *connected* households for example use other water sources when no water is available from the networked piped system or the water quality is poor.

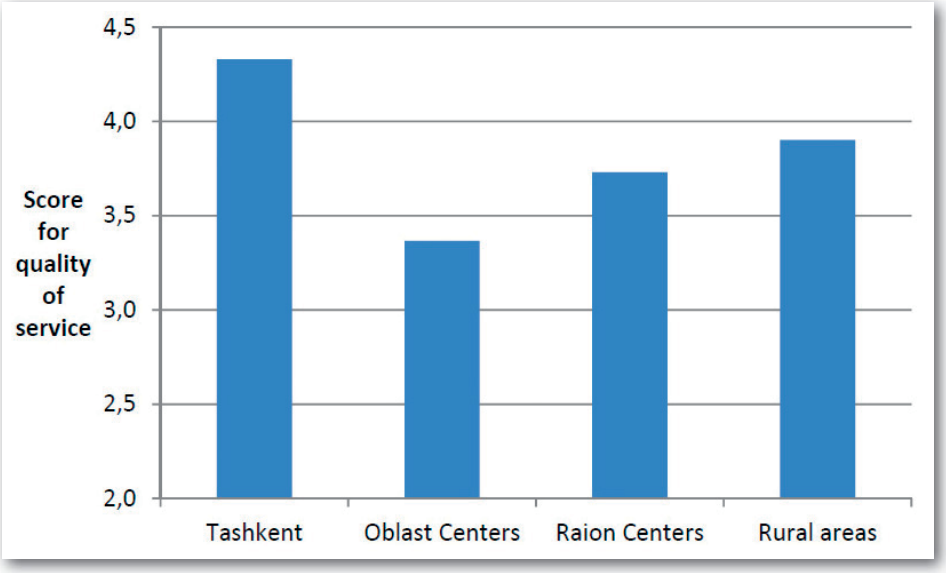
65. **Among the *connected* households in our sample important differences existed between households that are in the bottom 40 percent of the income distribution and those in the top 60 percent.** The proportion of *connected* households that relies on outside taps is much higher (38 percent) among the bottom 40 percent than among the top 60 percent in our sample (21 percent). In the selected Oblast centers 15 percent of *connected* households that are in the bottom 40 percent use irrigation canals as one of their main water sources, compared to only 3 percent of *connected* households in the top 60 percent of the income distribution. While slightly more than half (54 percent) of those that are *unconnected* to a WSS network belong to the bottom 40 percent of the income distribution the division is not clear cut and a sizeable proportion of the unconnected belong to the top 60% of the income distribution.

66. **Among surveyed *unconnected* households, those in the top 60 percent of the income distribution of our sample mainly make use of hand pumps, while the most common primary source for those in the bottom 40 percent is natural water bodies.** Unconnected households in the bottom 40 percent use primarily water from natural water bodies (37 percent) and hand pumps (33 percent). Piped water on the street is also used by 20 percent of unconnected households in the top 60 percent and 24 percent of unconnected households in the bottom 40 percent.

DRINKING WATER SERVICE CONDITIONS

67. **Households were asked to provide a score for overall quality of WSS services** using a scale of 1 (very poor service) to 5 (excellent service) (Figure 2). The highest scores were given in Tashkent (4.3) and the lowest ones were given in Oblast centers (3.4). It should be noted that responses may be relative to levels of expectation for WSS service, which may vary by type of location, e.g. consumers in 'Oblast Centers' may expect 24 hour WSS service, whereas consumers in rural areas may be satisfied with fewer hours of service.

Figure 2. Mean score for quality of WSS utility services by the utility company (1 = very poor and 5 = excellent]



Source: Household survey conducted for this study (n=300)

68. **The proportion of surveyed households reporting problems with their drinking water service conditions varied among the selected regions.** It ranged from 27 percent in Tashkent to 41 percent in Fergana, 48 percent in Jizzak and 78 percent in South Karakalpakstan. Overall, the proportion of households reporting problems with water was similar for both connected and unconnected households (somewhat less than 50 percent) and for both households in the top and in the bottom of the income distribution (also here slightly below half of the households in each of these groups reported problems).

69. **Surveyed *connected* households stated that water supply services often function only intermittently. This was said to be made worse by the unpredictability of interruptions and lack of notification of these interruptions from utilities.** Nearly three quarters of survey respondents who reported WSS problems stated that irregular water supply is their main supply issue (more so than quality and price). Of all households in our survey sample that received piped water on their property, the proportion that receives a 24 hour service ranged from 90 percent in Tashkent to just 3 percent in rural areas Look-up other numbers. Interviews with vodokanal officials and focus groups with consumers suggested that the intermittency of supply was caused by interrupted electricity supply which stops pumps, vodokanal redirection of flow to industrial / commercial customers for certain periods of the day, lack of water availability or intentional rationing of supply to customers. Three-quarters of connected households in our survey sample claimed they were never or only sometimes notified of major modifications to water supply schedules. Of the connected surveyed areas, notifications from utilities are most likely in Tashkent (47 percent of respondents reported they were always notified) and not provided in rural areas (all survey respondents reported they were never notified).

"We have networked water in the yard. But it flows one day and then not for ten days." - Beruni rural connected Focus Group participant number 1

"Especially on a Saturdays and Sundays there is no flow - when people need to wash, clean, cook..." - Ahangaran connected raion center Focus Group Participant number 1

It should be noted that the Government of Uzbekistan - jointly with donors - is currently undertaking a series of investments to rehabilitate and extend the water supply and sewerage system in the country.

70. **Insufficient water pressure for consumers in the survey areas was said to often result from the poor state of WSS networks**. Low water pressure was a common complaint in focus groups, interviews and the survey – particularly for households located at the end of a network trunk main[11], and for those living in upper level apartments, who often reported needing to get water from their lower floor neighbors. During summer, greater levels of domestic consumption, coupled with significant demand for garden irrigation[12], greatly reduces pressure in the system (55 percent of surveyed connected households reported weak pressure in summer). Focus groups reported internal tap flow rates less than 1 liter per minute in some cases.

71. **Low pressure problems were reported to be compounded by limited flow durations, as residents overload the system trying to access water when it becomes available[13], leaving their taps open**. Vodokanal supply management practices and expansion of the customer base into new urban areas were two other possible reasons reported for low pressure in WSS networks[14]. Interviews with vodokanal officials and other supply-side stakeholders suggest that some network losses could be as high as 60-70 percent percent in systems[15] with pipelines of up to 70 years old. Some infrastructure is so old and degraded that isolating sections of conveyance or distribution infrastructure for maintenance and repair works is impossible.

"We live in a high level apartment and have water only at night, when all the neighbors are asleep. And then to us a small trickle of water becomes available, and for those 1-2 hours we collect all the water we can in containers." - Fergana connected oblast center, Participant number 3

"The conveyance pipe was installed in 1964. The system is now deteriorated. The vodokanal does not put normal pressure on the system for fear that pipes may burst." - Fergana connected oblast Center, Participant number 11

72. **More than half (57 percent) of *connected* surveyed households using internal taps reported water *quality* problems.** The most widely reported problems were presence of particles / turbidity (41 percent) and high salinity levels (19 percent). Users of *unconnected* sources reported even more water quality problems. For households using hand pumps, salinity and turbidity were the most frequently reported water quality problems. For households accessing natural water bodies (rivers, lakes, ponds, natural reservoirs), the most frequently reported quality problems were salinity, bad odor, bad taste and turbidity / particles[16].

73. **Some focus groups reported cases of community members organizing independent laboratory testing of water samples and results not meeting drinking water standards for some indicators.** Interviews and focus groups suggested that such water quality problems could be caused by either inadequate water treatment[17] or a deterioration of the conveyance and distribution systems, or both. In rare cases, households reported not using their networked supply for drinking purposes and instead using other sources (Figure 3).

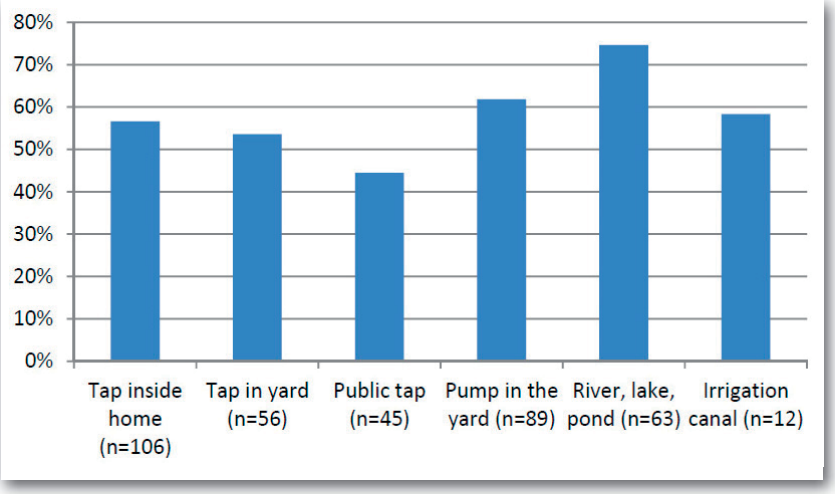
"We tested the quality of our tap water at a laboratory. Its composition in many ways does not meet drinking water standards." - Fergana connected oblast center Participant number 11

11 Low pressure and limited water schedules during peak times experienced by customers at the tail end of distribution systems is also reported by ISR (2011).
12 Also reported by ADB (2013).
13 Also reported by ADB (2013).
14 Some interviewees suggested that some vodokanals may be reluctant to operate WSS networks at normal pressure for fear of pipe bursts. Other interviewees suggested that due to urban expansion in some housing areas, the number of connected customers has grown but without any corresponding increase in overall system pressure to account for those new customers, flow rates may become low for new and existing customers.
15 The figures reported in our interviews with supply-side stakeholders are not too dissimilar to water network losses of 50-60 percent of total volume reported by OECD (2011). The OECD reported that their quoted losses are four to five times higher than recommended best practice for network losses.
16 Note that no tests to check the quality of water were conducted for this study.
17 For example, in South Karakalpakstan, the major municipal surface water source – the Amu Darya River – is among the most sediment laden rivers in the world with high salinity levels (Small et al. 2003). Hence, significant treatment is needed to make such sources potable.

2. ACCESS TO DRINKING WATER AND SANITATION SERVICES

"We buy five-liter plastic bottles of filtered water. We buy them for drinking water purposes. We use water from the tap only for washing and other domestic purposes." - Nukus oblast city connected Participant №1

Figure 3. Proportion of households reporting problems with drinking water quality by source (%)



Source: Household survey conducted for this study (n=300)

74. **Seasonal variation in water quality is experienced by users of both connected and unconnected sources**. Almost half (47 percent) of responding connected households with internal taps experienced seasonal variation in piped water quality. 69 percent of households directly using water from natural water bodies (e.g. river, lake, canal) reported that water quality[18] differed across seasons. Focus groups reported that summer is more likely to produce higher turbidity and salinity and lower pressure (34 percent of households who water a garden using internal taps, taps in yard, or public taps reported this). 21 percent of households using water for farming purposes also used connected water sources[19]. Reported winter problems included freezing of insufficiently insulated pipes.

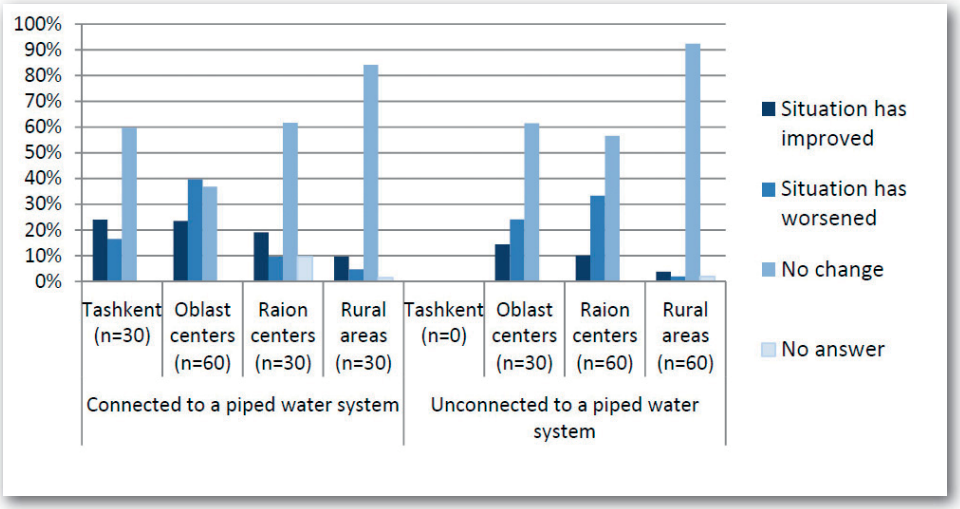
"Water does not come to our house in the summer due to low pressure. Instead, we have to carry water from other sources." - Jizzak oblast center connected Participant number 12

"Because of the cold weather during January, nine household taps froze and burst. Three months later there was still no water." - Dustlik rural connected Focus Group Participant number 6

75 **About a quarter of all surveyed respondents felt that WSS conditions had worsened over the past 5 years. Most noted no change over that period[20]. Fourteen percent had witnessed improvements.** Oblast centers had the greatest proportion of *connected* respondents who thought that their WSS conditions had worsened (40 percent). The greatest proportion of *unconnected* households reporting worsening of WSS conditions in the past five years was among sampled households in Raion centers (33 percent), followed by Oblast centers (24 percent) and rural areas (2 percent). Interestingly, the greatest proportion of *connected* households reporting *improvements* in WSS conditions in the past five years was also in the Oblast centers selected for our study (24 percent of households), followed by Raion centers (19 percent) and 10 percent in rural areas. Lastly, the greatest proportion of *unconnected* households reporting *improvements* in WSS conditions during the past five years was those in the selected Oblast centers (14 percent of households), followed by the Raion centers (10 percent) and only 3 percent in rural areas sampled for our survey (Figure 4).

18 In their study in the western region of Uzbekistan, Kudat et al. (1996) found that salinity and turbidity were the most widely reported water quality problems for households, and more severe in summer months.
19 33 percent of surveyed households use natural water bodies for garden watering and 32 percent use hand pumps forthat purpose. 36 percent of households using water for farming purposes used river, lake, pond, other natural reservoir or canal and 35 percent used hand pumps.
20 It should be noted that much of the degradation in the WSS systems may have occurred outside the 5 year timeframe asked in the survey. This may explain why the majority of respondents stated that no change had occurred during that period. Focus groups often suggested that conditions had been poor for a considerable period.

Figure 4. Trends in the quality of WSS service conditions, by type of location (percentage of surveyed households saying situation has improved, worsened or remained the same).



Source: Household survey conducted for this study (n=300)

ACCESS TO SANITATION SERVICES

76. **Only one quarter of all households in our survey had access to a centralized sewerage system**. None of the households in our sample in Raion centers and rural areas had access to a sewerage network. And among surveyed households who were connected to a networked water supply system, less than half (48 percent) were also connected to a sewerage system. This implies that most wastewater does not find its way into a central sewerage system and may be disposed of directly into the environment without treatment.

"We are not connected to a sewerage system. To install a concrete septic tank, you have to pay for the materials and construction. I have no husband, so I do not have such wealth. Therefore, we, the children just dug a hole for our toilet wastewater " - Dustlik city unconnected FGD participant number 3

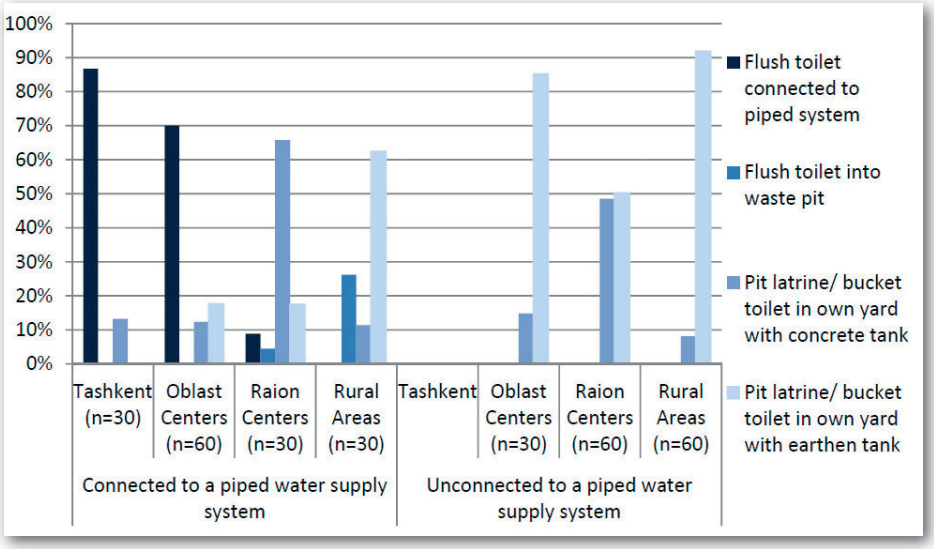
Photo 3. Indoor flush toilet, Tashkent

77. **Only 20 percent of households in our sample had toilets located inside their home. This figure was 41 percent for households in our sample that are *connected* to a water supply system.** 90 percent of Tashkent households *connected* to networked water supply and 70 percent of Oblast *connected* households used flush toilets. The vast majority of *connected*

households in Raion centers had a pit latrine or bucket toilet with a concrete tank in their own yard. Most *connected* and *unconnected* households in the sampled rural areas had a pit latrine[21] with an earthen tank (Figure 5).

Photo 4. (a) Pit latrine in a household yard, (b) Sewage discharge pit, Dustlik rural household

Figure 5. Proportion of households in the survey sample using a particular type of toilet, by location, for those with and those without connection to a piped water system

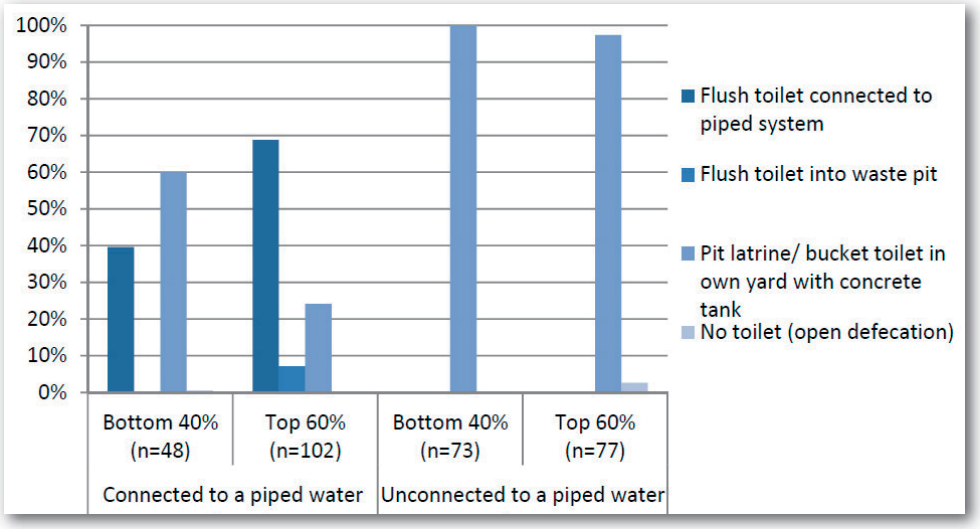


Source: Household survey conducted for this study (10 sites, n=300)

78. **The proportion of connected households with a flush toilet connected to a piped sewerage system was much higher among those in the top 60 percent of the income distribution** (68 percent of this group had one) (Figure 6). This compares to just 40 percent of the bottom 40 percent of households by income. The majority of households in this lower wealth category had pit latrines in their own yards despite being connected to a piped water supply system. Only 46 percent of surveyed unconnected households report always having water available at their sanitation facility.

21 Pit latrines - typically covered with a roof and a door – are located within a private yard or in a public area to prevent odor and insects (flies and mosquitos) infiltrating living areas. Earthen pits are often constructed by members of the household for minimal cost and are filled in and re-dug in a nearby location when they fill up (or emptied during winter). Concrete septic tanks are significantly more expensive to construct and usually done by contractors. They require periodic cleaning either by household members or contractors.

Figure 6. Proportion of households in the survey sample using a particular type of toilet, by wealth level, for those with and those without connection to a piped water system



Source: Household survey conducted for this study (n=300)

INSTITUTIONAL FUNCTIONING

79. **Officials involved in WSS that were interviewed for our study conveyed that water utilities often have severe debts and cannot even afford basic operating expenses for delivering their services[22].** They claimed that low tariffs and significant arrears of many customers, together with high operational costs, contribute to this situation. These payment arrears sometimes include electricity debts, further exacerbating their problem of being unable to provide reliable drinking water supply and poor service. Pipes and pumps of Vodokanals suffer from increased wear and tear, and shorter operating life, when power cuts are frequent and sudden. According to consumers and vodokanal staff participating in our study, vodokanals lack equipment to conduct even the most basic operational, maintenance and rehabilitation tasks.

"In Dustlik city, water is only provided in the morning 6-8am and in the evening 6-8pm, as the debt of the water utility to the electricity utility causes pumps to be switched on only at this time." - Dustlik city vodokanal chief IDI

"A week ago, a main pipe burst. For three days it flowed uncontrollably. I took a video and posted it on the Internet. The vodokanal does not have a mini excavator. Residents had to collect money to hire an excavator. I personally gave 15,000 UZS, others contributed 7,000 UZS, or as much as they could. We asked if the vodokanal had equipment for welding – they did not. They didn't even have their own transport." - Ahangaran Connected Raion Center Focus Group participant number 7

It should be noted that, following a government decision to that effect, water meters and modern billing systems are presently being installed to improve fee collection.

80. **In addition to hardware constraints, interviews and focus groups also identified a lack of technical and human capacity in many vodokanals[23]**. Vodokanal staff reported that they struggle to attract and retain quality staff. Some vodokanal respondents stated that few colleges train emerging professionals appropriately and even then low salaries do not incentivize them to work at vodokanals. Hence, they have many unskilled staff and a large staff turnover.

"The vodokanal says that they have too much work and not enough workers." - Jizzak city connected FGD Participant number 1

22 IBNET data for Central Asia shows that utility revenue / cost ratios are the lowest in Uzbekistan (0.73). Many years of revenue / cost ratios below 1 have led to high levels of indebtedness.
23 Uzbekistan is reported to have one of the lowest 'staff per customer ratios' in the EECCA region – approximately one staff per 1,000 customers (EAP Task Force, 2011).

2. ACCESS TO DRINKING WATER AND SANITATION SERVICES

81. **Vodokanals are only partially decentralized – they have broad responsibilities but no autonomy to set tariffs or reform operational systems**. Vodokanals have responsibilities for sourcing, treatment, conveyance and customer relations. However, they do not have any input or control over water tariff setting. Water tariffs are set by the Ministry of Finance in the central government. Currently, water tariffs are lower than tariffs for other utilities. Cost recovery for water utilities is too low. Many interviewed vodokanal officials believe tariffs should be higher and commensurate with other utilities (gas, electricity). Furthermore, vodokanals do not have the ability to take out loans for operations or capital investment.

82. **Survey data and focus groups indicate that water utilities tend to be slow in responding to customer complaints.** A quarter of *connected* households had a member who had contacted the vodokanal regarding a problem with water supply and sanitation. Of those, nearly half had received a response within a week, while one third had to wait longer than one month. Response times were generally longest in rural areas (two thirds had to wait longer than one month). Problems remained completely unsolved in almost half the cases. This proportion was highest in Oblast centers (53 percent). Even mahalla committees, representing residents, struggle to get responses from vodokanals. Many consumers felt the unresponsiveness and indifference of the vodokanal staff to be frustrating. Consumers often conveyed that in order for vodokanal officials to respond to emergencies such as flooding of sewage or burst pipes, they sometimes demanded up-front informal payments from residents.

"The vodokanal is very difficult to deal with. Not far from our house a major pipe burst in winter and water was flowing out of that for three months. Because of this, the roads were covered in water, which turned to ice. People could not use the sidewalk. Every day we called the vodokanal, but nobody came to us."- Fergana connected oblast center Participant number 1

"About three years ago we wrote a letter saying that we need water. All residents signed it. But we have not received any response. "- Dustlik city unconnected FGD participant number 9

83. **Both demand-side and supply-side stakeholders reported that sometimes there is confusion over responsibilities for certain aspects of the WSS network, particularly in apartment buildings**. Interviews suggest that part of this lack of clarity seems to be a legacy of post-Soviet era privatization schemes which affected some state property (e.g. apartment blocks and internal piping) but not others (e.g. conveyance infrastructure). An outline of official responsibilities of various stakeholders at the local level is provided in Annex A.

"This year my son's apartment had problems. So, we wrote and called the khokimyat and mahalla. The mahalla committee told us that they have no means to help and we must address it at our own expense. Previously, our homes were government owned but now they are privatized. The khokimyat tells us that it is our apartment and that we have to do everything ourselves, at our own expense." Participant number 8

84. **In some locations, interviewees reported that separate water supply and sewerage utilities served them, which tended to be problematic for both consumers and utility staff**. Even in Tashkent, focus group discussion participants claimed that they have to deal with separate utilities for water supply and sewerage, even if they pay a single fee for both services. A vodokanal chief in Jizzak stated that combining management of the two services would help reduce personnel costs, would be easier for consumers to understand and would promote better integration of services.

85. **Interviews and focus groups reported that some vodokanals offer water tanker services to customers in rural areas, as a cheaper, easier and more profitable alternative to rehabilitating infrastructure**. This initiative represents a temporary solution to systemic problems in rural WSS services, but reportedly satisfies some rural households who can afford the high charges for delivery of small volumes. However, the low proportion of households reporting using such services suggests that many continue to use alternative free sources – such as rivers, ponds and irrigation canals - even if the quality of that water is often very poor.

86. **Coordination between public electricity and drinking water utilities can be poor, worsening the reliability of drinking water services.** Focus groups and interviews reported only intermittent electricity supplies in most surveyed areas and its subsequent impact on water delivery ('no electricity' means 'no pumping', which means 'no water delivery'). More than half (55 percent) of connected respondents believe that their supply of water is strongly or fairly strongly dependent on electricity service. This was regarded as a significant issue in rural areas (93 percent) and Raion centers (77 percent), but much less so in Tashkent (13 percent) where electricity supply seemed more consistent.

"There is a coordination problem. When electricity supply is available, often there is no-one at the water tower to turn the pump on. Electricity can be provided all day and yet no water flows. And then, when they finally turn on the water pump, the electricity goes off soon after." - Jizzak Oblast center connected Participant number 1

87. **Local government and vodokanals stakeholders have communicated to consumers that they cannot do much to improve services without additional funds from central government**. Almost all stakeholders concede that local budgets for WSS services will not permit comprehensive rehabilitation of the WSS infrastructure. Repairs using locally available resources were said to only be bandaid solutions addressing the symptoms but not the causes. Vodokanal officials and local government staff interviewed for his study consistently stated that additional resources and expertise are desperately needed. Residential consumers partly understand the position of water utilities and that a systematic approach to rehabilitating the entire network is required. Further, many vodokanals seem to have communicated to residents that a national program for development is imminent and that has appeased some communities temporarily.

HOW DO HOUSEHOLDS COPE WITH POOR SERVICE CONDITIONS

3.

3. HOW DO HOUSEHOLDS COPE WITH POOR SERVICE CONDITIONS

88. The previous chapter presented the different sources of drinking water and the types of sanitation services that contrasting groups of households use. We found that most households use multiple sources of drinking water and that these, as well as the type of sanitation services used, differed among wealth groups and location. We also saw that in the sites outside Tashkent service conditions were often poor. This chapter discusses how surveyed households deal ('cope') with the lack of quality drinking water and sanitation. It also provides some evidence regarding independent action that some communities in our sample have undertaken to improve their WSS service conditions and presents a series of case studies of households and their coping mechanisms.

89. **To cope with irregular water supply and pressure and quality problems, households have at least one additional source of water. Forty percent of all surveyed households claimed they rely on a secondary water source on a regular basis and six percent reports also using a tertiary source**. 29 percent of *connected* households reported using a secondary water source, and of those, 77 percent reported using it more than once per week. As an example, some *connected* focus group participants in South Karakalpakstan Raion Center described using four different sources of water, each for different purposes: (i) connected supply for drinking and household needs (when available), (ii) hand pumps for household use and garden watering (water was considered less palatable (salty)), (iii) bottled water as a secondary drinking source (although this is expensive and used less often) and (iv) irrigation canals for watering gardens (seasonally used and quality is too poor to be used for other household purposes). Where water supply through the network is very poor, alternative sources usually become the primary source.

"From August to May we get our water from our neighbors. After the month of May, we use water from the irrigation canal." - Dustlik city unconnected Focus group Participant number 1

90. **Wealthier households may be able to afford expensive alternative sources, such as bottled water and tanker water delivered to their homes, while poorer households have less affordable options**. Fifteen percent of all networked households use bottled water, which may cost up to UZS 300 (0.13 US$) per liter, about 1,000 times more than vodokanal water. In contrast, according to participants in focus group discussions, poor residents have fewer alternatives and are often forced to use unhygienic sources of water such as irrigation canals and rivers or ponds, which can take more than half a day to collect in some areas (including walking and carrying) and which typically have poor quality water.

"We have no one to carry water. My husband works and my sons cannot carry water so far. My husband calls the taxi driver and he delivers canal water to our home for a fee. We pay him only for transport. But, we pay him more than if he was just transporting people. Some other households must cart by donkey or by hand." - Dustlik city unconnected Focus Group Participant number 9

"The canal water has a bad color but we just boil it for drinking because we cannot afford other options." - Dustlik rural connected FGD Participant number 7

91. **Survey data suggests that public taps can provide one of the few forms of 'improved' water sources for unconnected households.** Water from public taps is networked water (it should be the same quality as household water connections). However, the flow rate of public taps can be low and unpredictable and they are often too few in number to cater to demand. Most residents are also charged non-volumetric user fees for accessing public taps.

Photo 5. Public tap near school, Jizzak city

92. **Focus group discussions with unconnected households revealed that water from groundwater pumps is a convenient source for many, but often subject to quality concerns for potable use**. More than half (61 percent) of unconnected households using water pumps reported water quality problems (Figure 3). Focus group discussions and individual interviews revealed that consumers are aware that using open water sources, such as irrigation channels, rivers and ponds for potable and household use is potentially unhygienic, but still use them when there are no other options.

"If a hand pump draws water from good depth, the quality can be good. If drawing from only four to eight meters, it is salty and can be harmful to the body." - Buruni unconnected raion center FGD Participant number 7

Photo 6. Hand pump in yard, Beruniy Raion, Karakalpakstan region

93. **Survey results show that most households subject the water that they use to some forms of treatment prior to drinking and cooking.** 84 percent of connected households using internal taps used some form of household water treatment to make the water suitable for use. Common forms of treatment for connected households for water from *internal taps* are boiling (69 percent), settling out of particulate matter (27 percent) and filtering (13 percent). Only 16 percent of households with internal taps reported not using any form of treatment. 63 percent of households with *water pumps in their yard* boil their water and 24 percent let it settle.

"We need to let the water settle, because there can be sand in it. Its quality is not very good." - Nukus city connected Focus Group Participant 9
"For lunch, we use water that we collected in the container in the morning. We let it settle before we use it." - Beruni connected FGD district city Participant 4

3. HOW DO HOUSEHOLDS COPE WITH POOR SERVICE CONDITIONS

Photo 7. Water filtration using cotton wool in the neck of the bottle, Tashkent

94. **Focus groups and surveys show that many households use storage containers to collect and store water**. Households with *outside taps* (or sources further away) will fill up containers to transport water back to the house. Many households, connected and unconnected, store water in containers to allow particulate matter - the most widely reported water quality problem reported in the household survey - to settle before decanting water for use. In some areas, households install larger and more permanent tanks to store water outdoors.

"We have two plastic drums. We also have buckets and basins. In all these we store water. We use water in the drums for the toilet and the water from the buckets for cooking." - Jizzakh city connected FGD Participant number 7

"Here I have a big storage tank, and I fill it. I buy a ton of water for 20,000 UZS. And for my household this water then lasts for twenty to twenty-five days." - Dustlik unconnected rural area FGD Participant number 3

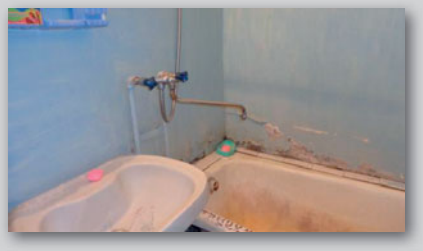
Photo 8. (a) Mobile storage containers and water heating vessels, Beruni (b) Water storage tank, Dustlik rural area

95. **Focus group discussions revealed that individuals and communities increasingly install their own sanitation systems. Many households manage their own sewage disposal, installing pit latrines or other disposal options.** Some respondents claimed that in some apartments with networked water connection, but no sewerage system, residents had extended pipes out of upper story windows to dispose of wastewater into drains down below. This allegedly led to complaints from neighbors about the odor.

96. Box 1 to 4 present case studies of households coping with various drinking water and sanitation service conditions.

Box 1: Household case study – One bedroom apartment, Tashkent city





This residence was located on the tenth floor of a twelve story apartment building in Tashkent city. The apartment was built in 1996. It contains a centralized water and sanitation system.

Water is available 24 hours per day, seven days per week. Water pressure is adequate for all seasons, except during summer when it is low. This low pressure has been a problem since 2006. There is reportedly notification prior to any planned severance of service. The household has one 10-liter bucket – enough for one day – for those occasions.

The residence receives cold water supply, hot water supply, heating, gas and electricity. Hot water service is turned off for 5 days each spring and autumn. The bathroom contains hot and cold water supply. The Home Owners Association (HOA) manages the pipework in the building, including in the basement. The costs of any pipe replacements incurred by the HOA is divided among all residents and added to the HOA fee.

Tap water was reportedly odorless and with a satisfactory taste but was not considered very clean. It has a yellow color and contains particles. The household filters the water using cotton and boils the water in a kettle. The treated tap water is used for cooking purposes, however often the household uses bottled water for drinking. The household contains a private flush toilet and bathroom all within the apartment. The toilet system operates smoothly without blockages.

The household pays on average 2-3,000 UZS per month for both cold water supply and sewerage in a combined bill, all calculated based on a water meter. The metered payment system is considered transparent and easy to understand. Cold water has the lowest cost of all the utilities the household pays. The household would be willing to pay 1-2,000 UZS more per month for better quality water that does not require household treatment and stable pressure throughout summer.

Source: field work conducted for this study

3. HOW DO HOUSEHOLDS COPE WITH POOR SERVICE CONDITIONS

Box 2: Household case study– Nukus Oblast Center, Karakalpakstan

The household is located on the 4th floor of a 4-storey building and is connected to piped water supply and sewerage. Water is supplied through the internal taps each day, but periods of service are intermittent and unpredictable. Typically, the household receives water 12pm-3pm, 6pm-7pm and for a short period in the early morning up to 7am and late in the evening up to 11pm. The water supply is more consistent in winter than in summer. The 4th floor apartment suffers from low water pressure, particularly during summer time. If residents in the lower floors have taps open, then the 4th floor does not receive flow. If residents in the lower floors are not using their taps, the 4th floor receives sufficient flow.

The household does not use a secondary source of water but copes with the intermittency of supply by storing water in the kitchen and bathroom when it is available. Water is settled in containers during the day and either used directly or boiled before use. Household members estimate that they spend up to an hour per day replenishing 60 liters for storage in containers in the kitchen and bathroom / toilet. An adult female or child carries out this task.

The household uses water for drinking, cooking, washing dishes / floors, and laundry. The household has not received hot water for almost two decades, and heats water on a gas stove for mixing with cold water for bathing and washing purposes. Water is reported to beodorless, transparent and with a pleasant taste, but contains particles (which need to be settled out). Cases of minor illness were attributed to water.

The household replaced all WSS pipes inside the apartment about five years ago (materials and labor costs of 200,000 UZS). The household pays approximately 3,500 UZS per month for water, which the household members estimate is 2.5 percent of their income. The bill is paid in cash at the vodokanal or by credit card. The bill is based on a meter reading and the household members prefer this to a normative non-volumetric billing system. However, they do acknowledge that it is difficult to verify the accuracy of the meter reading. The household members describe the WSS utility service bill as difficult to pay (given their income), but is much lower than electricity and gas utility expenses.

The household contains a flush toilet within the apartment connected to a centralized sewerage system. The toilet either flushes conventionally when piped water is available, or is manually filled from a 30 liter bucket that they keep stocked with water for flushing when piped water is unavailable. Household members report that the toilet system operates smoothly, but that twice a month on average they clear blockages themselves. However, for lower level residents, the household members report more frequent and severe sewerage system blockages requiring contractors to fix.

This household is not willing to pay more for WSS services. However, they would like a more consistent supply to their residence, particularly in terms of timing (24 hours per day) and consistent pressure. If so, the household would try to buy a washing machine.

Source: field work conducted for this study

Box 3: Household case study – Single storey house, Tashlak Raion center, Fergana

This household receives piped water in their yard. The water supply times are unpredictable and depend on two factors: (i) the availability of electricity and (ii) the utility supplying water in the distribution system. Household members reported that in summer electricity is unavailable up to 10 hours per day (about five outages per day lasting 2 hours), with severances in service being unpredictable. In winter, the period of unavailability increases up to 12-15 hours per day. When electricity is unavailable, household water supply is unavailable. The household does not pay for water via a meter. Instead, payment is based on the number of people in the household – for their household they pay 6-8,000 UZS per month in cash directly to a vodokanal inspector. The volume of water available to the household is sufficient if there is adequate electricity.

The water pressure for this household is good but the household members report that residents at the end of the street have low pressure. Water quality is reported to be odorless, transparent and without visible particulates. Water is used for cooking, drinking (usually as tea), bathing, washing dishes / house, laundry and garden in summer. The household does not boil water specifically before using, although for drinking tea andcooking they stated that the water is heated as part of the process. There was some attribution of minor illness to water. The current volume of water available is insufficient to grow vegetables but less water intensive trees and flowers are grown.

When the yard water supply is unavailable, the household must go to a source in a nearby mahalla. The trip takes 20 minutes to walk and the queue can be 30-60 minutes. Males usually undertake this task because of the heavy load of transporting 15-20 liter containers.

Water is heated using a water heater (recently installed), gas stove (fueled by replaceable gas cylinders – the household is not connected to a centralized gas supply) or using an electric kettle when electricity is available. For bathing, water is heated on the gas stove and mixed with cold water. The household recently installed a 50L capacity water heater at a cost of 600,000 UZS.

The household uses a pit latrine and septic tank located away from the main dwelling. The yard tap is used for hand washing with soap. The septic tank is cleaned annually (30,000 UZS cost) by a contractor.

The household would be willing to pay up to 25,000 UZS per month if they received uninterrupted centralized tap water 24 hours per day and connection to a sewerage system. This would require reliable electricity supply. They would also like to connect to a centralized gas supply.

Source: field work conducted for this study

3. HOW DO HOUSEHOLDS COPE WITH POOR SERVICE CONDITIONS

Box 4. Household case study - Kahramon rural village, Jizzak




The dwelling is a single-storey house built by the State in the 1980s.The main source of water for the entire mahalla is a public tap located at the school. The tap typically operates year-round 24 hours per day but has a low flow rate, particularly during summer and winter months. Household members, mostly women, walk 600 meters before lining up to collect water from the public tap. Household members can queue for up to one hour. Each day, three trips to collect water are made with two buckets each time.

The tap water is reportedly odorless, clear, tastes pleasantly and with no particles. This water is chiefly used for drinking, cooking and washing dishes and clothes. The household pays approximately 6,000 UZS per month (for a five-person family, 1,200 UZS per person). This is supposedly incorporated into the school fees.

Two supplementary water sources are used. For special celebratory events, the household pays (15,000 UZS) to get water delivered by a tractor to fill their large water tank. Also, seasonally water from an irrigation ditch is collected for non-potable purposes, such as bathing, watering the garden and cleaning the house. The household has both buckets inside the house for storage of water and a larger water storage tank outside the house. The household spends money on plastic containers (30-50,000 UZS per container) as needed. The household typically boils water before using it for consumption but does no other treatment. Water can be heated on a gas stove (via a gas bottle), in an electric kettle (when electricity is available) or on a firewood stove. The household uses firewood heating preferentially sometimes to save expenditure on gas and electricity. Household members bathe by heating water on the firewood stove and mixing the heated water with cold water.

The household contains a separate concreted toilet area. The sewage goes into a pit and drains into the soil. The pit has had to be cleared by a contractor once in the past two years (cost of 20,000 UZS). The pumped material was used as a soil fertilizer on the fields. A pitcher of water is available for washing hands after using the toilet.

Compared to electricity (40,000 UZS per month) and gas bottles (20,000 UZS per month), water costs are significantly lower. The household understands that water is a cheaper utility cost than gas or electricity,but they don't like paying the same rate for water as someone who has a tap on their premises, when they haveto expend great time and effort to collect water.

The household lives in expectation of receiving a central gas supply, water supply, sewerage and stable power supply. The household would like to be connected to a piped WSS supply because they spend a lot of time and effort on maintaining sufficient water for household purposes. The household is willing to pay to connect and to pay ongoing tariffs according to the vodokanal rate.

Source: field work conducted for this study

COMMUNITY AND PRIVATE SECTOR INITIATIVES

97. **The qualitative data gathered for this study suggests that there is a high level of informality in the WSS sector with residents in the sampled sites often taking matters into their own hands**. Some communities appear to have become more independent in securing access to WSS services. They increasingly band together to repair dysfunctional WSS systems or to install their own systems. Individual households also increasingly make their own - not necessarily well-informed - judgments on what is acceptable water quality for consumption[24].

98. **Evidence from interviews and focus groups suggests that where mahalla committees function well, they can help communities cope by facilitating them to come together to solve some WSS-related problems**. For example. focus group participants and interviewees in Fergana Oblast center reported that frequent leakages and burst pipes prompted the mahalla committee and the residents to come together to address the problems themselves. Together they rehabilitated their system and the shirkat permitted payment for future discounts on shirkat fees. There were other cases of communities fixing and maintaining WSS systems (such as public taps) in the absence of vodokanal efforts.

"Last year, we decided at a meeting to change the whole building water supply system in the basement. We raised the money ourselves, bought all the materials - pipes, valves, gate valves - hired private technicians and replaced everything. We did all this together with the mahalla committee, and we billed each apartment. The costs were then subtracted from the rent." – Fergana Oblast center connected FGD Participant number 4

"We teamed up with the neighbors and made some plumbing repairs. Eight households were united." - Beruni unconnected raion center FGD Participant number 6

"The vodokanal would not help. They say that we are not connected to the network, and therefore can do nothing to help. I wrote everywhere for support but we received none. We do things ourselves." - Beruni unconnected rural FGD Participant number 1

99. **One focus group reported that one united community at some stage refused to pay for the poor WSS service and effectively forced the vodokanal to cease providing service to them**. A community in an Oblast enter refused to pay for poor service from an obsolete system that rarely functioned and the community knowingly accumulated debt. The utility eventually ceased supplying water to the area.

"Let the authorities begin to serve well, and then people can start to pay." – Jizzak city connected FGD Participant number 5

100.**Some communities are working in conjunction with private companies or local entrepreneurs to address the poor WSS service conditions, as was found by some focus groups.** In some cases communities initiated and constructed local infrastructure in conjunction with private sector parties. One entrepreneur had paid for the laying of 500 meters of pipework to improve water supply conditions. Some small-scale entrepreneurs were selling purified water that is of better quality than what comes from the tap or pumps. These entrepreneurs sell water in public areas. In one Raion center residents are trying to restore water sources (wells) to provide public tap access. Focus groups report that in the Fergana Raion center, 87 household residents – without permission from the vodokanal – extended the network from the public taps to connect water to their premises.

"Near our house one entrepreneur established a unit for water purification. You can go and buy water from this entrepreneur by the liter. We buy the water and use it for tea. It is not salty and has same quality as in Tashkent." -Buruni unconnected raion center Focus Group Participant number 7

24 ADB (2013) reports in their Uzbekistan study areas that many consumers "have simply given up on the public water utilities. Instead, they install their own [systems]."

Box 5 describes a case of a community partnership with a private company.

Box 5: Community partnership with a nitrogen plant to supply water to a rural area in Fergana.
Originally, only 15 percent of the village population had access to piped water, but about three quarters of them work in a nitrogen plant. Residents wrote a letter to the nitrogen plant seeking assistance for them to access its water supply. Since 2000, about 100-110 households use this water. While the water is free of charge from the plant, residents invested in extending infrastructure (pipes/taps) and maintenance. Residents carry out maintenance and repair on the system as necessary. Street outlets are well-spaced (100m apart) and deliver water 24 hrs per day. Interruptions are very rare (annually for 1 week). One focus group participant had connected a small diameter pipe from one of the public taps to his household. The community has no arrangement with a vodokanal, just with the nitrogen plant. The system is not without minor problems – pressure varies between distribution points (beginning of street versus end of street) and the water is considered hard, leading to calcification of kettles, etc. Residents use hand pumps for backup and irrigation canals for watering garden plots. They store water inside the house.

Source: field work conducted for this study

HOUSEHOLD COSTS INCURRED FOR MEETING DRINKING WATER AND SANITATION NEEDS

4.

4. HOUSEHOLD COSTS INCURRED FOR MEETING DRINKING WATER AND SANITATION NEEDS

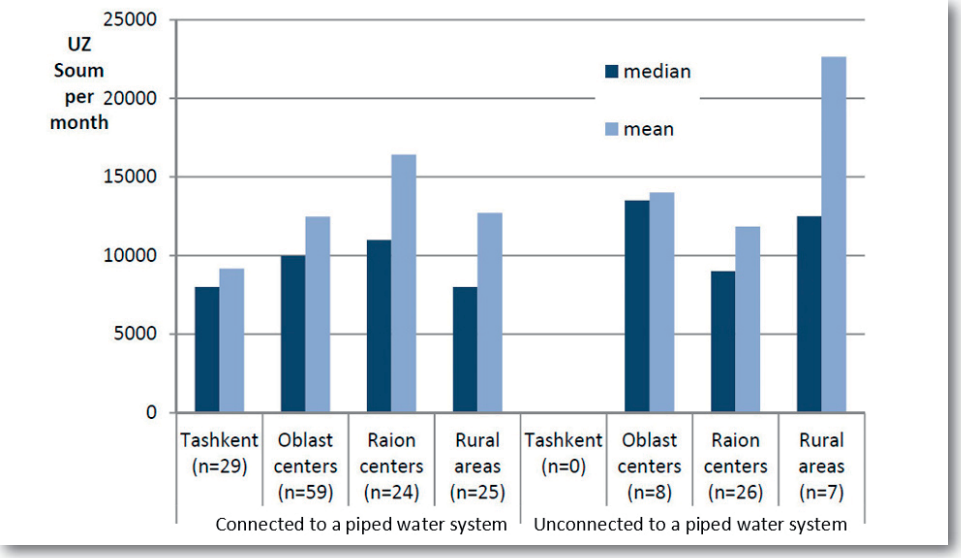
The previous chapter discussed how households cope with poor WSS service conditions. In this chapter we will first review the expenditures different groups of households incur for meeting their drinking water and sanitation needs as well as how heavy these weigh in the total expenditure of these groups of households. This is followed by a presentation of households' views and experiences regarding tariffs and billing systems and the pros and cons of metering. The chapter then discusses the health impact and other non-monetary costs of poor WSS service conditions and reviews how the current situation impacts differently on men and women.

HOUSEHOLD EXPENDITURE ON DRINKING WATER AND SANITATION

101. **Focus group participants claimed that both connected and unconnected households incur *one-off* investment and *recurrent* costs in addition to costs for piped water/ bottled water to meet their WSS needs.** *One-off* costs were said to include, among others: (i) installation of water pumps at UZS 400,000-750,000 (USD 167- 312), depending on depth of the pump; (ii) installing a concrete septic tank for about UZS 300,000 (USD 125), buying plastic containers for collecting, transporting and storing water, reported of UZS 30,000-40,000 (USD 12.50 to 16.70) and (iv) purchasing filters and paying for pipe repairs. Some households also reported high costs for operating their own WSS facilities. According to focus group respondents, such *recurrent* expenditures can include: annual cleaning of septic tanks at UZS 150,000 (USD 62); and (iii) payment for household delivery of water via tanker, taxi, etc. for up to UZS 15,000 (USD 6.20) for 500L in some areas.

102. **The median, *unconnected* household in our sample in Oblast Centers and rural areas spent UZS 12,500 – UZS 13,500 (USD 5.20-5.60) per month on *recurrent* water expenditure[25]. This is 60 percent more than the median *connected* household in Tashkent who spends UZS 8,000 (USD 3.30) per month (Figure 7)**. According to our data, household water expenses are lowest in Tashkent even if service there appears to be better than elsewhere. Unlike the other sampled areas, drinking water bills in Tashkent also include sanitation services.

Figure 7. Average reported monthly *recurrent* direct household expenditures* on drinking water in the selected sites.



Source: Household survey conducted for this study (n=300)

* includes bills for private connections, for using public water pipes as well money spent on bottled water and trucking services. Does not include one-off expenses such as purchase of filters, pumps, and storage tanks, and pipe repairs.

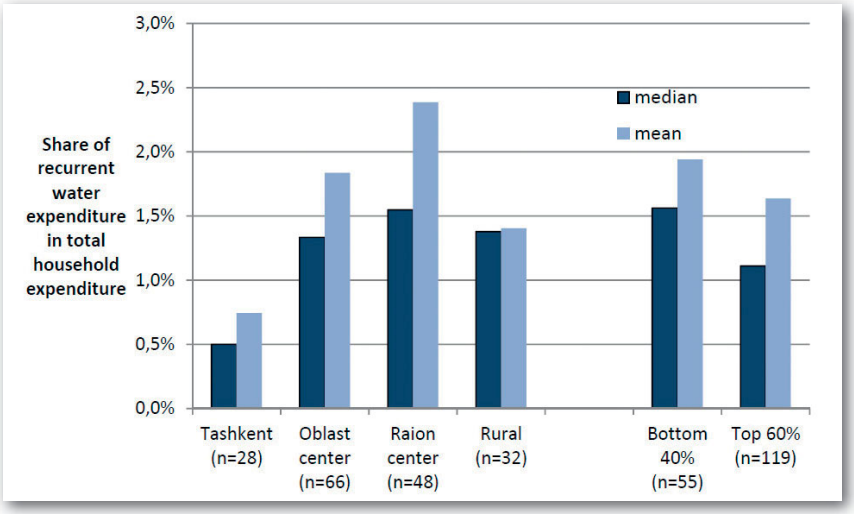
25 Water expenditure as used in this paragraph and Figure 8 includes bills for private connections, for using public water pipes and truck delivery and bottled water

103.**Median water expenses for connected and unconnected households together are highest for our sampled households in South Karakalpakstan and Fergana** (both UZS 15,000 or USD 6.3) per month). This is almost double the median spent by the sampled households in Tashkent and also higher than those in Jizzak (UZS 6500 or USD 2.7).

104.**The share of recurrent monthly water expenditures as a proportion of total monthly household expenditure[26] was much lower among our sampled households in Tashkent (0.5 percent at the median) than those in the selected Oblast centers, Raion centers and Rural areas (1.3 - 1.5 percent at the median) (Figure 8).** Budget shares of recurrent drinking water and sanitation expenditure were higher for those in the bottom 40 percent of the income distribution (median of 1.5 percent) than the top 60 percent (1.1 percent). Focus groups in rural areas suggested that some households, due to the seasonal and sometimes in-kind nature of their incomes, have lower capacities to pay monthly utility bills.

"Before we can sell our garden products, we have no money. Therefore, for two or three months, we did not pay for electricity nor water." - Dustlik rural connected FGD Participant number 7

Figure 8. Median and mean proportion of *recurrent* direct billed household expenditure spent on drinking water and sanitation needs* across the four sample locations, and for the two wealth groups



Source: Household survey conducted for this study (n=300)

* includes bills for private connections, for using public water pipes as well money spent on bottled water and trucking services. Does not include one-off expenses such as purchase of filters, pumps, and storage tanks, and pipe repairs.

105.**The share of recurrent monthly water expenditure as a proportion of total monthly household expenditure in surveyed Uzbekistan households generally lies within international norms[27]**. Many authors refer to an affordability ratio of 3 to 5 percent as a general guide (Saunders and Warford 1986, Damme and White 1984, McPhail 1993 in Fonseca 2014). Davis & Whittington (nd) report that the range in OECD countries typically lies between 0.8-1.2 percent. In this report we assume a

26 Median total household expenditure is UZS 700,000 (about US$ 300) per month. The mean is somewhat higher (UZS 911,000 or about US$ 390) per month. Median total per capita household expenditure is UZS 133,000 (US$ 56) per month, much lower than the official Gross National Income (GNI) per capita which was US$ 158 per month in 2013, and somewhat lower than household final consumption expenditure per capita which was US$ 81 per month in 2013. Tashkent has the highest median total household expenditure. Household sizes are almost 50 percent larger for in the bottom 40 percent (average 7.4 members) than those in the top 60 percent (average 5.2 members).

27 It has been recognized by, amongst others, the World Bank, UNDP, the Asian Development Bank and DFID that setting these percentages has been an arbitrary process but that, as an initial tool, they can provide a rule of thumb (Briscoe, 1999; Waughrey and Moran, 2003). Fonseca (2014) reports some extreme cases of countries with low-income populations spending a high proportion of their income on water and sanitation services include Burkina Faso (29 percent of income of poorest of the population), Poland (10.8 percent for the poorest), United Kingdom (2 percent of households spend more than 8 percent of income).

4. HOUSEHOLD COSTS INCURRED FOR MEETING DRINKING WATER AND SANITATION NEEDS

threshold of 3.5 percent (see below). Based on affordability ratios[28], Uzbekistan may be classed as a country with high water subsidies and low water prices. While most surveyed households in all settlement types expend below the recommended ratio (Table 2), 13 percent of households in Raion centers and 3 percent of households in Oblast centers spend more than 5 percent of their total household expenditure on billed water services.

Table 2. Billed Water Expenditures as a Percentage of Total Household Expenditure – Percentage of Respondents in Thresholds

	Proportion of water expenditure as a percentage of total household expenditure							
	1% or less		1-2%		2-5%		>5%	
	No. HHs	Share of HHs	No. HHs	Share of HHs	No. HHs	Share of HHs	No. HHs	Share of HHs
Tashkent	21	75%	5	18%	2	7%	0	0%
Oblast centers	21	32%	26	39%	17	26%	2	3%
Raion centers	16	33%	15	31%	11	23%	6	13%
Rural areas	12	38%	13	41%	7	22%	0	0%
Total	70	40%	59	34%	37	21%	8	5%

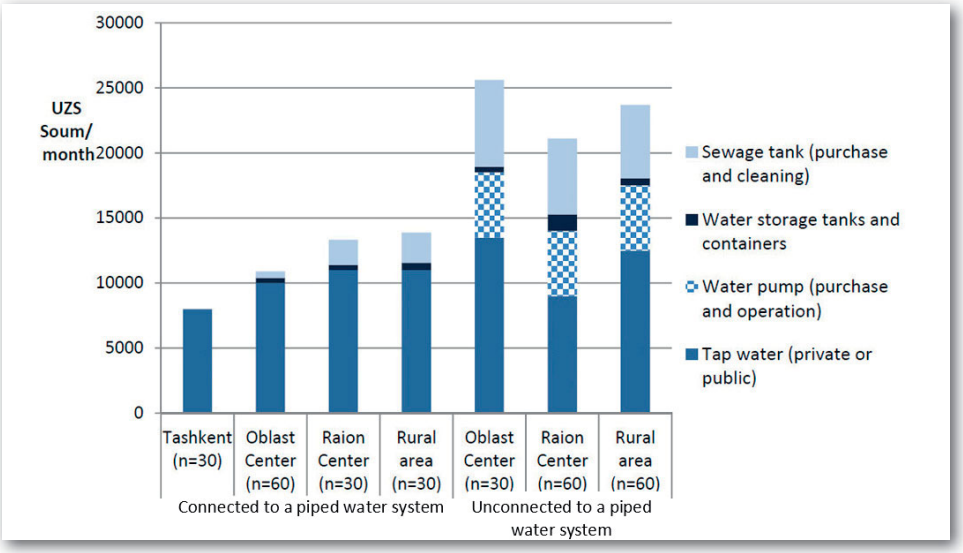
Source: Household survey conducted for this study (n=300)

106. **According to our survey data about half (49 percent) of *unconnected* households spent money installing their own sanitation systems, compared to 16 percent of *connected* households.** Furthermore, *unconnected* households also had much higher annual sanitation system operating costs (on average UZS 72,500 or USD 30.2) than the *connected* households paying tariffs for their sanitation service (UZS 18,900 or USD 7.9 per year).

107. **When we take into account *all* costs that surveyed households incur for meeting their WSS needs, *unconnected* households tend to incur much higher costs than those that are *connected* (Figure 9)**. Data collected through our focus group discussions and the household survey data show that households in Tashkent incur only about one third (UZS 8,000/ month) of the costs that *unconnected* households in Oblast centers or rural areas sustain (UZS 24,300-26,200). Median payments of surveyed households for piped water (private and public) varied between UZS 8,000 (Tashkent) and UZS 13,500 (unconnected households in Oblast centers). *Connected* households outside Tashkent incur additional costs for installation and operation of water pumps, water containers and installation and emptying of sewage tanks (only a minority of sampled households outside Tashkent are connected to a sewage system). *Unconnected* households reported higher costs for installing and emptying sewage tanks than *connected* households.

28 Smets (in Hutton 2012) finds that for eleven 'transition' countries in eastern Europe, the Caucasus and Central Asia, examination of the data shows that there are probably two groups of countries: those with high water subsidies and low water prices (affordability ratio for median households near 1 per cent) and those with reduced subsidies and higher water prices (affordability ratio of median households nearing 3.5 per cent).

Figure 9. Approximate full monthly cost of meeting drinking water and sanitation needs (in UZS) per location and for households connected and unconnected to a piped water system to their dwelling. This includes billed costs as well as costs incurred for dealing with poor service conditions.



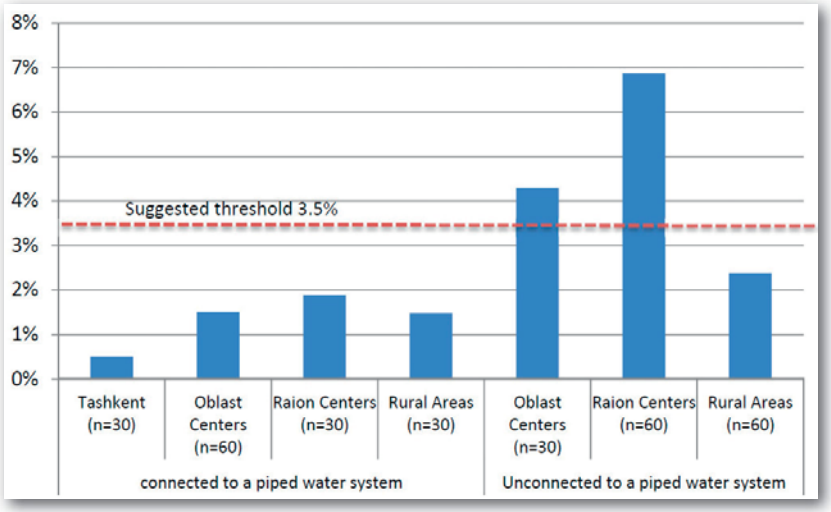
Source: Household survey conducted for this study (n=300).

Notes: Data are approximate. Estimates are based on data from the household survey. Where survey data were incomplete, data collected through focus group discussions were used. Figures should be regarded as approximate. Tap water costs are based on survey medians. Water storage tanks: based on survey median (UZS 24,000); assumed to last for five years = UZS 400 per month [adjust]. Water pumps: installation cost UZS 500,000 UZS (based on focus group discussions) to install (costs vary based on depth of well and local soil conditions between 400,000 – 750,000UZS). Lifetime assumed to be 10 years. Operation cost assumed to be UZS 10,000 UZS/yr (for valves, piping, etc.). (500,000/(5*12)) +(10,000/12) = UZS 5000 per month. Sewage tank: installation cost is UZS 300,000 (based on data from focus group discussions). Assumed to last 15 years. 300,000/ (15*12) = UZS 1,670 per month. Cleaning costs: based on survey median per subgroup (varying between 5000 and 250 per month). Assumes all unconnected household have a concrete sewage pit (95% of unconnected households have one). In rural areas and raion centers, almost all connected households have a sewage tank. Of all connected households, about half have a concrete sewerage pit, for this group we use the median survey data on 'sanitation costs'. Costs incurred for repairs of pipes and for building a toilet are excluded due to lack of data.

108.**The proportion of household budgets spent on meeting WSS needs when all costs are included (recurrent and one-off) can be twice as high for *unconnected* households than for *connected* households**. Using data from the household survey, supplemented with data from the focus group discussions, we find that household budget shares spent on WSS can be twice as high for unconnected households than for those that are connected. The additional cost of water pumps and expenses for cleaning septic tanks can weigh heavily on household budgets for unconnected households in particular in Raion Centers and Oblast Centers (Figure 10). These data ignore the non-monetary costs households also incur.

4. HOUSEHOLD COSTS INCURRED FOR MEETING DRINKING WATER AND SANITATION NEEDS

Figure 10. Median proportion of full household expenditure spent on meeting drinking water and sanitation needs (in percentage) per location and for households connected and unconnected to a piped water system to their dwelling.



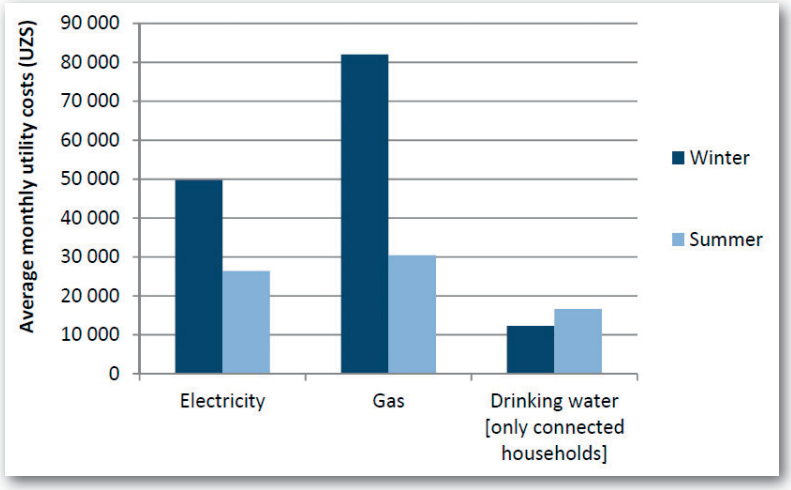
Source: Household survey conducted for this study (n=300)

Note: Data are approximate. Included are tap water costs, cost of buying water containers, costs of water pumps, and costs of cleaning septic tanks Estimates are based on data from the household survey. Where survey data were incomplete, data collected through focus group discussions were used. Figures should be regarded as approximate. Tap water costs are based on survey medians. Water containers costs are taken from the household survey. Water pumps: installation costs are UZS 500,000 UZS (based on focus group discussions) (costs vary based on depth of well and local soil conditions between 400,000 – 750,000UZS). Lifetime assumed to be 10 years. Operation cost assumed to be UZS 10,000 UZS/yr (for valves, piping, etc.). (500,000/(5*12)) + (10,000/12) = UZS 5000 per month. Sanitation costs are taken from the household survey.

109. **For households connected to a piped system, water utility costs were the lowest of all public utilities such as gas and electricity provision**. Gas was the most expensive utility cost for households – winter gas bills (on average UZS 82,000) of sampled households were four times higher than winter water utility bills (on average UZS 12,300). In summer however this is reduced to two times higher (Figure 11).

"Compared with other utilities - gas, hot water, garbage, electricity, telephone, the cold water – is not expensive." – Tashkent connected FGD Participant number 2

Figure 11. Average household utility billed (costs per month) in winter and summer.



Source: Household survey conducted for this study (n=300)

TARIFFS AND BILLING SYSTEMS

110.**Tariffs for drinking water and sanitation services were not often mentioned as a problem by connected household, despite recent regular tariff increases (from low base levels)**. Less than one percent of connected respondents reported that high bills were the major problem with WSS services. Some focus group participants reported that in the past period water tariffs have increased once or twice per year by approximately 5-10 percent. A number of focus group participants acknowledge that water tariffs are low and provide little opportunity for water utilities to maintain and upgrade WSS networks they are unhappy with rising tariffs when the quality of service from the vodokanal does not improve commensurately.

"Why do water tariffs keep going up? The system has a lot of leakages and vodokanal staff do not respond to problems. Factories and stores have water during the day, but we don't." - Ahangaran connected raion center Focus Group participant number 4

"There's a vicious circle. As residents we say 'how wonderful it is to have cold water so cheap'. But, because of that, the water utility has no money and cannot replace pipes." - Tashkent connected Focus Group participant number 7

111.**Most water bills are reportedly paid in cash to a collector.** Almost half of connected households claim they normally pay their water utility bill in cash to such a collector, almost one quarter pay the vodokanal office in cash, one fifth pays the vodokanal by plastic card, while 17 percent pays through a deduction of the salary of one household member, and 12 percent transfers the money by plastic card to the bank.

112.**Despite low tariffs, vodokanals and mahalla committees report an increasing trend in non-payment and arrears. Failure to pay is linked to the inability or unwillingness by utility companies to levy penalties or cut off water to households or agencies that do not pay.** 16 percent of networked survey respondents had not paid for water in the last 12 months for either 'no specific reason' (11 percent) or because they could not afford it (5 percent). A mahalla committee chairwoman in Fergana Oblast center, estimates that 40 percent of households in her mahalla are in arrears for water utility payments. There is a perception among some focus group participants that certain residents systematically avoid paying water utility bills while others pay diligently.

"Yes. Water fees are hard to collect hard because they do not cut off the pipe. You cannot leave someone without water. Therefore, people somehow pay for water last. Shirkat has to go and collect payments from people. "- Fergana connected oblast center Participant number 11

113.**Local government stakeholders were reported to have limited institutional / legal capacities to pursue cases of non-payment of water bills**. The legal process to recover non-payment of water bills was reported by vodokanal and local government officials to be convoluted and largely ineffective. Vodokanals do not have the resources or the capacities to pursue

cases and hence the lack of threat of recourse does not act as a deterrent for non-payment. 83 percent of respondents stated that there is no penalty for non-payment of water bills. Legislation improvements are called for by vodokanals to encourage customers to pay on time and in full.

"The debt that is currently owed to us by our vodokanal customers is 500 million UZS. Bailiffs cannot recover the debts and non-paying customers go unpunished. Because of this, water utility employees always receive administrative fines and reprimands." - Jizzak Vodokanal chief IDI

114.**Focus group participants and interviewees report disagreements between residents and the vodokanal in cases where residents are required to pay for access to public taps**. 27 percent of *unconnected* households in our sample said they were paying monthly water bills. These are mainly households that utilize public water taps. For example, in the selected Raion center in Jizzak, consumers are charged 1,000 UZS per person per month by the water utility, even though households have no connection to the water network and the only source is a public water tap four streets away. Often focus group participants claimed they are not aware what rate they should be paying to the vodokanal for access to the public water taps. Furthermore, focus group participants reported that despite paying the fees for accessing public water taps, residents often take on the maintenance and repair of such systems in the absence of vodokanal efforts.

"They say that if we drink water from public taps, we must pay!"- Dustlik city unconnected FGD Participant number 8

"We all agree, it's not fair to pay the same price for public taps as people who have water in their house" - Dustlik unconnected rural area FGD participant number 8

Photo 9. Public tap being used for clothes washing, Jizzak city

115.**Vodokanal officials stated that the public needs to be better educated on responsible water use and payment**. A major objective of vodokanals, khokimyats and mahalla committees is to raise awareness of the population about the importance of timely payment of utility bills and efficient use of water resources. Newspaper and television campaigns were said to be implemented for these purposes in some areas.

METERING

116.**Sixty-one percent of households in our sample stated that their bills are calculated on a normative basis (based on the number of people in the household) and only 39 percent said that their consumption is measured through a water meter.** Even in Tashkent only 40 percent of households in our sample had a meter. *Connected* households that have a water meter paid less (UZS 6,000 at the median) than households that pay their bill based on normative pricing (UZS 10,000) according to our survey data.

117.**The highest mean water meter tariffs were reported in the three Raion centers (573 UZS/m3 or US$ 0.23) and South Karakalpakstan (634 UZS/m3 or US$ 0.25)**. The lowest water meter tariffs were found in the three Oblast centers (473 UZS/m3 or US$ 0.19) and Tashkent (521 UZS/m3 or US$ 0.21). Regionally, there was significant disparity in water meter tariff rates as these ranged from 271 UZS/m3 (or US$ 0.11) in our Fergana site to 634 UZS/m3 (or US$ 0.25) in our sample in South Karakalpakstan.

118.**Focus group discussions with consumers revealed there is some confusion about the potential cost-savings associated with metering methods. The majority (almost two thirds) of surveyed households with normative water billing did not want to change to a metered system.** Water meters were least popular in the sampled Raion centers (only 17 percent preferred them there). Reasons for not wanting meters included: saving money (70 percent), not believing the tariff would be fair for the level of service provided (24 percent) and 'not needing to change' (20 percent). Some focus group respondents in rural areas revealed that connected rural households did not want meters as they felt that they would be charged more under a metered system because of their garden / farming water use. For the approximately one third of respondents that wanted meters (32 percent), almost all expected it would save them money (97 percent), and many also said it was because they did not trust the normative tariff for the level of service provided (31 percent)[29]. A normative billing system may not be favourable for consumers where service is poor, but utilities may prefer it. Normative billing provides little incentive for vodokanals to improve their service, as consumers are charged the same bill even if no water is supplied.

"We leave the water running for 5 minutes before pouring it into the kettle. When the tap is first turned on, the water is yellow and has an odor. After 5 minutes, the water is clear and odorless. We do not want to pay for the water that is too dirty to use."- Fergana connected oblast center Participant number 1

"If there is good pressure and the water flow is constant, meters will need to be installed. Otherwise people will use that water for watering gardens and washing cars. It is necessary that users pay for those privileges." Dustlik raion Center connected water utility worker (attended a Focus Group)

NON-MONETARY COSTS

119.**Focus group participants conveyed that water collection and treatment can impose a significant burden of time and effort for both *connected* and *unconnected* households**. According to our survey data, households that rely on natural water bodies (about a quarter of all household and 70% of the bottom 40 percent in rural areas in our sample) and public water taps (half of households in our three Raion centers) generally transport water over the greatest distances. Almost one fifth of those for whom water from natural water bodies is an important source travel 500-1,000m each way. And 63 percent of users of public taps live 50-1,000m away from them (Figure 12).

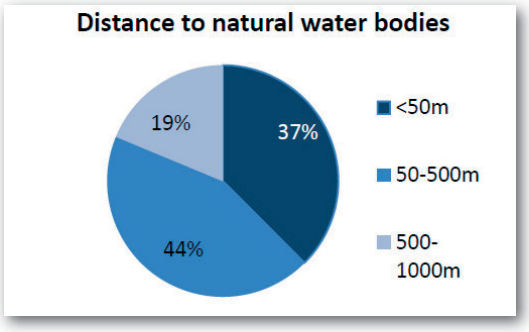
"It takes from morning until afternoon. We have to leave to collect water in the morning…. If the queue is large, we will sit there until dinner. "- Dustlik unconnected rural area FGD Participant number 2

"During the cotton season, men and women both go to the fields to pick cotton. When they arrive home, there is no water in the house. The women must then go in search of water."- FGD Participant number 4

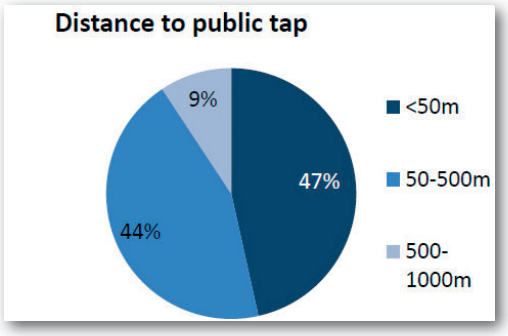
29 It should be noted that the government of Uzbekistan has raised the coefficient used for determining the fees of non-metered connections to promote the installation of water meters by customers. Cabinet of Ministers Resolution of the Republic of Uzbekistan, №300 dated November 6, 2013, and №337 dated November 6, 2012.

4. HOUSEHOLD COSTS INCURRED FOR MEETING DRINKING WATER AND SANITATION NEEDS

Figure 12. Distance to ponds, rivers and lakes and to public taps for those that rely on this source for at last part of their needs.



n=43



n=32

Source: Household survey conducted for this study

120.**In some areas, time spent on water collection can impose significant opportunity costs on household members**. In Jizzak, some focus group participants stated that, on average, they could spend six hours per day walking two kilometers to the public tap outlet, waiting in line, and then walking back with full containers. Even in networked households, the often inconsistent and unpredictable supply of water necessitates adjustment of schedules and restricts some household members' movements. The whole 'process' (including settling and treatment) can take up to a day in some reported cases. This impacts some household members' opportunities for employment, education and leisure.

"I am a seamstress. And instead of stitching that is necessary to carry out the order, I spend time fetching water and I waste time. I have even had to postpone orders and customers are dissatisfied." - Dustlik city unconnected FGD Participant number 4

"The hours we spend collecting water we could spend working in the garden, cooking, educating the children. Instead when the children come home from school, we go with them directly to collect water. We spend a lot of time collecting water." - Dustlik city unconnected FGD Participant number 5

121.**16 percent of surveyed *unconnected* households and 9 percent of surveyed *connected* households claimed to have suffered negative health impacts because of poor WSS conditions.** Among these, more than half mentioned gastrointestinal diseases and almost a quarter reported urinogenital - kidney stone diseases. Participants in focuas group discussions held in South Karakalpakstan in particular mentioned kidney stones and salt deposits in the joints purportedly due to drinking poor quality water. Some residents stated that such diseases have already become prevalent in school age children these days and that parents find it difficult to ensure children only drink water after it has been boiled.

"Doctors from the district center periodically conduct medical examinations of children in schools and kindergartens. These medical examinations revealed many cases of goiters in children. And doctors say that this is due to the fact that the composition of the water we use to drink does not contain enough iodine. Previously goiters in children were very rare. But over the last 5-10 years, the number has increased dramatically." - Tashlak unconnected rural FGD Participant number

"You just have to go to the hospital to see how many patients there are with water-related illnesses, people with kidney stones, salt deposits in the joints." - Nukus connected oblast center FGD Participant №7

122.**Medical bills for acute and chronic illnesses attributed to WSS conditions were reported to be significant in some cases and sometimes caused constituted ongoing costs for households**. Study respondents reported the approximate cost of treatment for some WSS-related health conditions to be: 700,000 UZS (US$ 230-280) for treatment of gall stones; 600,000-800,000 UZS (US$ 200-320) for treatment of jaundice; 400,000-500,000 UZS (US$ 133-200) for surgery to remove kidney stones. In addition to high medical treatment costs, focus group participants reported lost incomes due to illness or caring for ill household members. Additionally, many households cannot afford such expenses, so instead simply endure their illness.

"The ongoing costs of medical care for people ill from water-related diseases must be taken into account. Often they require special diets – fresh fruit in the winter, which is hard to get. Therefore, when a child is ill, parents are forced to buy expensive products. "- FGD Participant number 9.

123.**Poor wastewater management, including leaking sewage pipes, constitute a serious health risk, according to focus group participants.** Unattended sewage leaks were said to lead to sewage pooling on the surface, as well as infiltration of sewage into local groundwater systems used for drinking water and deteriorated potable water pipes[30]. Particularly during summer, it was reported that there are many insects around pit latrines, which can breed and spread infection. Furthermore, household members who clean their own septic tanks or earthen pits themselves often report getting ill from it. Many cases of chronic disease/illness are attributed to poor WSS conditions[31]**.**

"Water discharging from the toilet is clogged up in the basement. It produces a disgusting smell and there are many flies around." - Jizzak city connected FGD Participant number 4

"My husband and son clean our septic tank. My son always gets nausea. There were times when they get malaise and vomiting." - Beruni rural unconnected FGD Participant number 5

Photo 10. Container and bucket for washing hands after toilet use, Dustlik rural area

124.**Outdoor (pit latrine) toilets reportedly present challenges to some household members.** Focus groups suggested that during summer pit latrine toilets can be odorous and attract insects that can harbor and transmit disease. Focus groups also suggested that during winter the often harsh weather conditions, longer hours of darkness (and associated increased security risk for users of toilets in public locations) discourage people from using outdoor toilet facilities. Many focus group participants reported getting colds from outside toilet use and some stated that on occasions certain household members, such as the elderly or children, would use a bucket or other receptacle inside the house rather than use the outdoor toilet facility. 82 percent of surveyed households, where a pit latrine is the only formal toileting option, confirmed that elderly, children and disabled household members find it difficult to venture outside to the pit latrine (particularly unaccompanied) and may be physically unable to use a 'squat' toilet.

"None of us have well-maintained toilets. Although our toilets have walls and are made of concrete, there is still the smell, and during the winter they are very cold. And in addition we still have to deal with constantly cleaning them out. It would be nice if we had a sewer." - Dustlik raion center connected FGD, Participant number 7

"When relatives and friends come to visit, we are very ashamed to take them to our pit toilet. It is dirty, difficult to use and away from the house." - Tashlak raion center unconnected FGD Participant number 9

30 Medecins Sans Frontieres (nd) reports that leaks and water loss through the conveyance and distribution systems diminish the quantity of water available for consumption. Authors such as Whittington (2002) report waterborne diseases being caused by contaminated groundwater leaking into piped distribution systems.
31 Other studies in Uzbekistan have found that run-down and leaking distribution pipes can indeed be a primary source of diarrheal pathogens in water (Semenza et al 1998).

4. HOUSEHOLD COSTS INCURRED FOR MEETING DRINKING WATER AND SANITATION NEEDS

125.**Nearly a quarter (23 percent) of surveyed connected households surveyed had witnessed local conflicts regarding WSS issues**. **Some illegal connections were also said to exist.** Most disputes concerned problems with WSS service delivery (77 percent), quality of service from the vodokanal (71 percent) and poor infrastructure / facilities (62 percent). Disputes over payments were insignificant (3 percent)[32]. Consumers also reported that queuing for water at public sources can be a source of tension, particularly when queues can include up to 150 people. Some focus groups attribute reductions in water pressure in some networked systems to illegal connections. Vodokanal staff reported conducting random inspections to monitor appropriate use of networked water (especially related to garden watering) and levying fines.

"Those who live in apartments do not use water for irrigation. And those who live in detached houses sometimes illegally install water pumps to water their gardens. Because of this, the water in the pipes stops flowing. So we have to go and take water from the hand pump." - Beruni connected district city FGD Participant number 5

GENDER DIFFERENCES

126.**Survey data show that adult females overwhelmingly bear the burden of household chores connected with water collection and use**. 85 percent of surveyed unconnected households reported that adult females typically participate in collecting water, compared to 57 percent of adult males, 17 percent of males under 18 years of age and 9 percent of females under 18 years. Many women in focus groups report lower back pain from repetitive lifting and moving heavy containers. In 98 percent of the households in our survey, it is adult females who are engaged in cooking, washing dishes, and doing laundry. Focus groups suggest that women are generally responsible for household water treatment as well.

"All the housework is done by women. They also look after the cattle. Therefore, many of their tasks create back pain. For those who do not have equipment, they carry water in buckets by hand over long distances." – Beruni unconnected rural FGD participant number 13

Photo 11. Women are most often responsible for water collection, storage and use, Dustlik rural area

127.**A fifth of surveyed women feel unsafe using the sanitation facilities available to them.** Focus groups suggest that in cases where toilet facilities are located in public areas (some households in our survey sample in raion centers in Jizzak and Fergana use such facilities), there are higher safety / security concerns relative to private toilets. On average, public toilets are located at a distance of 30-60 meters from the house, but there are also some households for which the toilets are located at a distance of 500 meters.

32 Households were allowed to give multiple responses, thus totals add up to more then 100 percent.

"We are already accustomed to this [toilet on the street]. This has been the way since our ancestors. But, of course, we would also like to have those same amenities as in Tashkent and other cities. But Allah can help us, and with time we will get the same facilities." - Beruni unconnected rural FGD Participant number 7

128.**Among unconnected households, many survey respondents felt that a household connection to networked WSS would benefit women in particular.** 61 percent of respondents felt that a household water connection would improve the lives of both males and female equally. 39 percent felt that it would improve the lives of women more[33].

33 A survey reported in ADB (2013) in the Fergana Valley found that women and girls bathe less frequently when water in the household is limited.

WILLINGNESS TO PAY FOR IMPROVED SERVICES

5.

5. WILLINGNESS TO PAY FOR IMPROVED SERVICES

129.The previous chapter presented the expenditures households in our sample incur for meeting their WSS needs and summarized their views on billing and payments systems as well as metering. The chapter also discussed health impacts of the poor service conditions and how overall impacts differed between men and women. It was concluded that expenditure burdens are highest for those that are not connected to a piped water supply system given their high coping costs. Health impacts were claimed by many respondents to be considerable. This chapter will look at how much households are willing to pay to be connected to a piped system and receive high quality drinking water supply services.

130.**Surveyed consumers are already demonstrating their willingness to pay for improvement of their WSS situation via various independently initiated improvements, as revealed in focus group discussions.** Actions taken independently by consumers to improve their WSS service have included replacement of internal pipework within dwellings and improvement of local off-premise supply systems. Most of these pro-active measures have required direct monetary and (often) labor input from residents themselves. Also, some households without functioning central WSS services have experienced such services before and understand how beneficial a resumed connection would be.

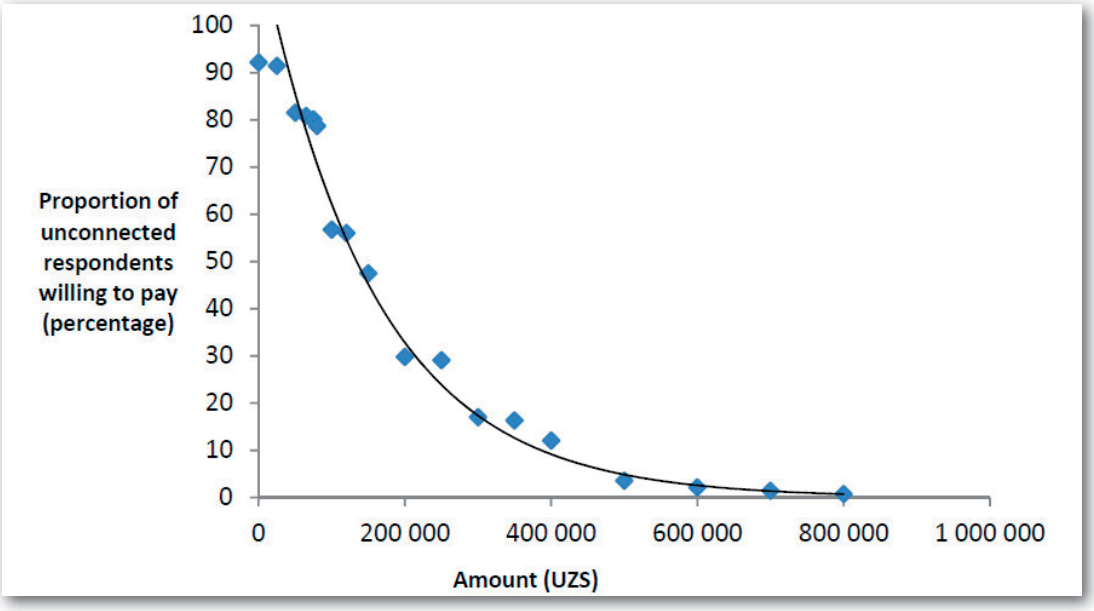
131.**Nearly all unconnected households (86 percent) in our sample reported they were willing to pay for connection to a high quality water supply and sanitation system that provides good quality piped water in sufficient amounts for 24 hours per day.** The answer was positive among both low-income and middle/high-income households. The median among those in bottom 40 percent of the income distribution was UZS 100,000 compared to UZS 200,000 for the top 60 percent. This amounts to an average of 2.7 percent of total annual household expenditure that all unconnected households were wiling to pay to connect to a well-functioning WSS service (Table 3 and Figure 13).

Table 3. Proportion of unconnected household willing to pay a particular amount to connect to a well-functioning water supply and sanitation system

Amount (UZS)	Percentage of respondents willing to pay amount (%)
50,000	91
100,000	79
200,000	48
300,000	29
500,000	12
600,000	4

Source: Household survey conducted for this study (n=141)

Figure 13. Demand curve for unconnected households willing to connect to a well-functioning WSS system, showing the proportion of households that are willing to pay a particular amount for being connected.



Source: Household survey conducted for this study (n=141)

Note: households were asked: 'suppose that it would be possible to supply good quality piped water 24 hours per day in sufficient amounts to meet all your drinking, service and sanitation needs, so that you would not have to use any other water sources, how much would you be willing to pay to be connected to such a system'. Answers were obtained from 147 respondents.

132.**Consumers surveyed for this study were asked how much they were willing to pay per month on a continuous basis for a high quality drinking water and sanitation service. Nearly half (42%) indicated they would be prepared to pay UZS 15,000 per month (close to what connected households currently pay), and about a quarter said they are ready to pay UZS 20,000 (Table 4).** This is somewhat higher than the amounts most households are currently paying for piped water and sanitation, but lower than the actual costs they are incurring now to meet their WSS needs (such as water pumps, costs for emptying septic tanks, etc.). Differences in willingness to pay per month between connected and unconnected households in our sample were small (Figure 14). The *mean* willingness to pay was highest for *unconnected* households in South Karakalpakstan (UZS 22,000 per month) but differences between the regional *medians* was small.

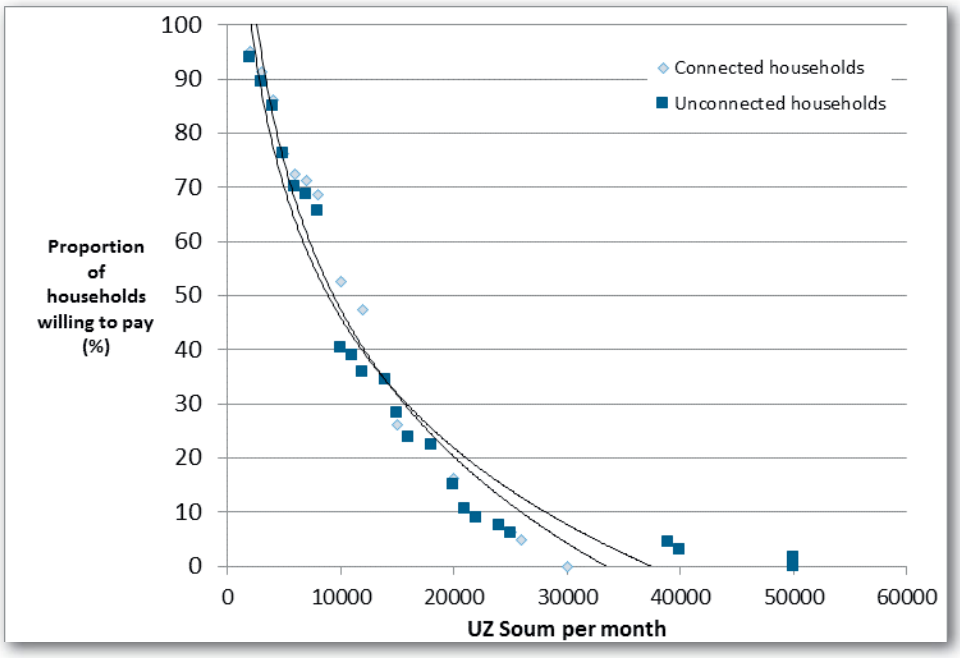
Table 4. Willingness to pay for high quality WSS service in UZ soum per month, connected and unconnected households combined.

Amount (UZS)	Percentage of respondents willing to pay amount per month (%)
2,000	100
5,000	86
10,000	67
15,000	42
20,000	24
25,000	12
30,000	5
40,000	2

Source: Household survey conducted for this study (n=147)

5. WILLINGNESS TO PAY FOR IMPROVED SERVICES

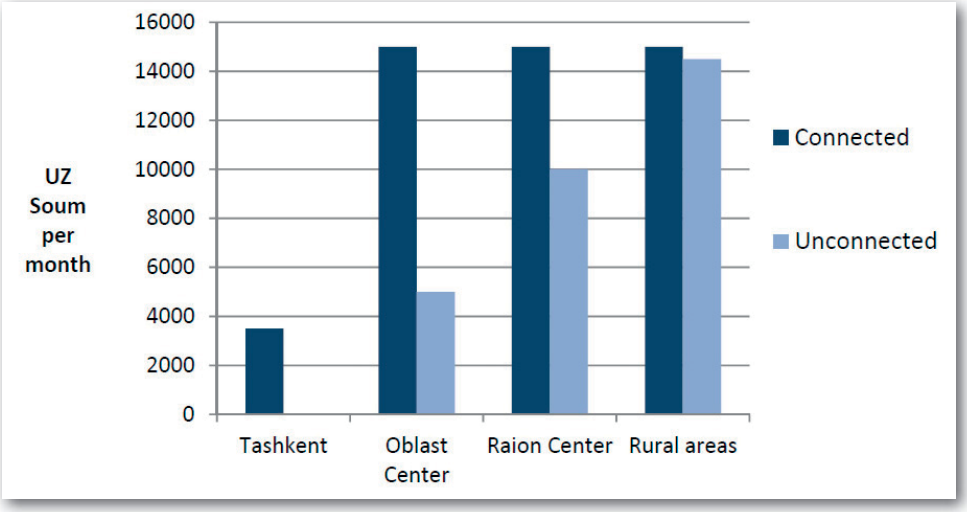
Figure 14. Demand curve for a well-functioning WSS system, showing the proportion of households that are willing to pay a particular monthly amount for a high quality service.



Source : household survey conducted for this study (n=147)

133. **Willingness to pay for ongoing water bills was highest among *unconnected* households in rural areas (UZS 14,000 per month) and lowest in Tashkent (UZS 3,500) (Figure 15).** As our data suggest, *unconnected* households in rural areas currently rely for a large part on poor quality river and pond water. They may therefore be most keen to obtain "Tashkent" quality of WSS services. Currently, according to our data, *unconnected* households are incurring more than UZS 20,000 per month for meeting their WSS service needs. Most surveyed *connected* households (82 percent) are also willing to pay for WSS improvements. This is highest among surveyed *connected* households in rural areas (83 percent), Jizzak (75 percent) and Tashkent (73 percent).

Figure 15. Median willingness to pay for high quality WSS services in UZ soum per month per location and for connected and unconnected households



Source : household survey conducted for this study (n=147).

134.**The preferred method of payment (lump sum or instalments) for connection to a good quality WSS service varies by wealth group and location type**. 53 percent of households in the top 60 percent in our sample would be willing to pay for WSS connection in a lump sum, compared to 44 percent of households in the bottom 40 percent. More than half of respondents in South Karakalpakstan (65 percent) and Fergana (59 percent) would prefer to pay in a lump sum, while 73 percent of households in Jizzak would prefer to pay via instalments. In Raion centers, most households would prefer to pay in a lump sum (65 percent) but only 48 percent and 34 percent of households in Oblast centers and rural areas respectively prefer that method of payment.

135.**Focus group participants in some areas agreed that tariffs are low but they are unhappy with rising tariffs and are not willing to pay more when the quality of service from the vodokanal is so poor**. Other focus group participants acknowledged that there is a vicious cycle of low tariffs leading to insufficient means for water utilities to maintain and upgrade WSS networks which in turn leads to poor service. However, some focus group and interview respondents want to see improvements in vodokanal services before committing to increased tariffs.

"People will agree to a 100 UZS tariff increase. But if you raise the tariff to 250UZS, then people will start to make trouble. They will argue: why such a sudden rise? " – Fergana connected FGD Participant number 11

SERVICES IN PUBLIC BUILDINGS

6.

6. SERVICES IN PUBLIC BUILDINGS

136.The previous chapter looked at willingness to pay for being connected to a piped water supply system and receive a high quality water supply service. It was found that many households in our sample outside Tashkent are willing to pay monthly fees that are commensurate with higher water and sanitation tariffs, as these monthly costs tend to still be below the amount they incur now for meeting their WSS needs. This chapter will look at the drinking water and sanitation conditions of public buildings including school and clinics, using data gathered through interviews with key informants in each of the research sites. Two case studies of WSS conditions in public building are presented, one on a clinic and one regarding a school.

137.**Public buildings often face similar water supply and sewerage challenges as households**. In some areas, water sources are located outside public buildings and toilet facilities are without running water. Focus groups and household case studies revealed that many children bring water bottles to school because of the lack of facilities on-site. ADB (2013) reports that schools often do not have canteens because water supplies are inadequate and do not meet catering and sanitary standards. Household case studies confirmed that school toilet facilities are often located away from the main building, and ADB (2013) reports that (in their project areas) the average distance from school buildings to toilets is greater than 200 meters.

Photo 12. (a) Water tap in school yard, Beruni city; (b) School toilet for teaching staff, Beruni city

138.**Some public facilities, such as colleges, with large potable water demands have basic treatment systems on site**. In larger institutions where the quality of available drinking water is unreliable, specific treatment installations, such as large tanks for boiling water, are used to provide potable water for students.

Photo 13. (a) Tank for boiling water at a college, Jizzak city; (b) Buckets containing boiled water in a medical center

139.**Poor water supply and sanitation conditions in public buildings may affect female workers and students the most.** ADB (2014) reports that it is women who often work in public institutions such as schools and clinics, where WSS facilities tend to be poor. Focus groups (in line with ADB, 2013) reported that it is often female teachers and clinicians that are required to take care of water deliveries for their schools. Also, IKS (2010) reports that latrines at schools are often unisex with no piped water or hand washing facilities and such conditions may be linked to absenteeism among girls, particularly adolescents.

Photo 14. Toilet facilities at a college, Jizzak city

140.Box 6 and 7 present case studies of public buildings and illustrate how public buildings (connected or unconnected) are coping with their current WSS conditions.

Box 6: Case study– Rural health clinic, Tashlak, Fergana Province

The two-storey health clinic has both a hand pump (with an electric pump installed) located 50 meters from the main building and hence has a free water supply. The electric pump pumps water up into a water tower (capacity of 3 tons, supposedly sufficient for 2 days demand) which feeds water into the building. The water tower and its connections to the pump / medical clinic was funded by the Khokimyat. This system provides consistent pressure into the clinic tap outlets. The pump and water tower function well, except for approximately 2 months in winter when the water in the tank freezes. If the pump fails or there are electricity failures, then staff can use the hand pump.

Water is used in the clinic to maintain sanitary standards. Handling and hand washing, tment rooms, washing floors, for drinking and watering the garden and flowers. Hot water supply is not available in the clinic, and when is obtained by boiling it in kettles / saucepans on a gas stove. Water is boiled for tea for patients to drink and there is a distillation machine on site to distill water for cleaning the medical equipment. Staff described the pumped water as being odorless and transparent but 'hard' and forming scum in kettles / cups. They notice saltiness and some particulates. Staff reported that digestive issues were common and that they attributed this to the water consumed. They thought a good quality central water supply system could help solve these problems.

The water supply system is cheap to operate and maintain, with expenditure imited to buckets, hose connections, electric pump repairs and replacement of minor pipework. In comparison to electricity and gas, water supply is considerably cheaper. For all utilities, winter is the most problematic period for water supply (frozen water in water tower), electricity (more unpredictable cuts in service) and gas (pressure lowest in winter, meaning that the medical center uses coal as an alternative).

A toilet located adjacent to the medical clinic building contains a septic tank. The nearest sewerage network is 4 kilometers away from the clinic. The toilet is treated with bleach to minimize odors and maintain hygienic conditions. A wash basin is located outside the toilet. Interviewed staff would like to be connected to a good quality central water supply and would accept the price charged by the vodokanal. They acknowledge that they are unable to resolve their problems and that they need to be addressed at the level of government.

Source: field work conducted for this study

Box 7: Case study- School, Berunyi, Karakalpakstan

The school sources its water from an outdoor public tap located on a nearby street for most of the year. In winter, the outdoor public water faucet freezes and the school instead sources its water from nearby households. For both sources, staff (generally the school cleaners and maintenance staff) carry buckets from the public tap / households to the school. The local households are further away and this task takes about half an hour.

Interviewees regarded the water as odorless and generally clean, but reported a white precipitate forming at the base of vessels after settling. It is boiled prior to use. Most children bring water from their homes to school in plastic bottles for their own consumption.

Most water in the school is used to wash the floors of classrooms and hallways, tering plants in the school yard, and for sanitation (filling of handbasins) and drinking purposes. The school contains a shower in the gym, but it is not used because there is no centralized hot water system.

The building has no hot water supply, so water is heated on gas stoves in winter.

Open pits connected to septic tanks are used for toileting. The toilet is located outside the main building at a distance of 120-150 meters on the street near the main entrance of the school. Interviewees reported that in winter some girls feel uncomfortable to go out to the toilet and all children risk getting colds. Hand washing stations outside the toilets are manually filled by technical staff.

Annual costs for water and electricity are similar (~500-600,000 UZS) but gas is considerably more expensive (~4.5 million UZS). The water bill is based on meters. Other water- related expenditures included containers for transport and storage. Unpredictable electricity outages are common but gas supply is reportedly reliable.The interviewed staff would like the school to be connected to the centralized water supply and sanitation system. The school would be prepared to pay double the amount they currently pay for such a connection. This would enable hand basins to have flowing water, water for showers and toilets indoors. The school cannot afford to change its system and awaits provision from the government.

Source: field work conducted for this study

BRIEF REVIEW OF DRINKING WATER AND SANITATION REFORM IN EASTERN EUROPE AND CENTRAL ASIA

7.

7. BRIEF REVIEW OF DRINKING WATER AND SANITATION REFORM IN EASTERN EUROPE AND CENTRAL ASIA

This chapter provides a brief review of recent literature on lessons learned from international reform of the drinking water and sanitation sector in Eastern Europe and Central Asia (ECA). It is presented in the form of three text boxes.The first one describes the Soviet legacy of drinking water and sanitation systems in the region. This is followed by a second text box on the 'low-level equilibrium trap' of the sector , followed by a third box that summarises approaches that have often been successfull and could be scaled-up and replicated. This overview borrows from a OECD (2011) report. More detail is presented in Annex E.

Box 8 – Soviet legacy of drinking water and sanitation systems

The infrastructure built during the Soviet era was relatively reliable albeit capital intensive. This can be explained by the fact that, at the time, the benchmark water consumption (consumption norms) and the planning standards (including the spare capacity in the event that water consumption grows in the long-term) were set at an excessively high level (frugal water consumption was not encouraged at that time). During the Soviet period, water pricing was focused solely on the objective of poverty alleviation, seeing water as a human right and attempting to provide free service to everyone. Cost recovery objectives were ignored, meaning financial resources had to be obtained from other sectors of the economy. This created macroeconomic distortions as the economic system struggled to meet such unfunded liabilities. Today these bills are coming due in the form of run-down utilities. Also, because water was provided free it was not used efficiently by consumers. The water supply system was overly expensive because the public sector attempted to treat and deliver more water to households than they really wanted or were willing to pay for. Water utilities did not have their own revenue streams and could not obtain sufficient resources from higher levels of government, meaning that water distribution systems became unreliable.

The end of the Soviet era led to substantial transfers of responsibilities to local governments in most countries and associated decentralization of water and sanitation services. This, in some cases, led to over-fragmentation of water and sanitation operators and created a number of challenges, such as inefficient scale of operations and difficulties to access financing – rural water services have particularly suffered from over-fragmentation. In many places, it was not possible to maintain access to water supply services, and some wastewater treatment facilities simply stopped operating. Inefficiency further increased because households left their taps open in the hope of collecting and storing water when it became available. So a policy of "free water" not only meant that the cost recovery and economic efficiency objectives were not met, but also that service quality itself declined.

Source: Whittington (2003) & OECD (2011).

Box 9. The 'low-level equilibrium trap' of the drinking water and sanitation sector.

The literature describes this trap as being characterized by features such as political interference in service delivery, inadequate investment and reinvestment to expand and/or maintain the system, low tariffs insufficient to cover expenses (below the marginal cost of provision), low consumer expectations regarding service quality and low willingness to pay, non-payment by customers and low levels of enforcement by agencies, and deteriorating service quality linked in a vicious cycle This leads to systems needing to be funded out of national funds rather than user fees, or more likely not being funded at all, and hence becomes difficult to finance. This also effectively subsidizes households with access to water and prevents extension of services to unconnected households.

Source: (Savedoff & Spiller 1999, Walker 1999, (Singh et al. 1993, Altaf et al. 1993, Spiller and Savedoff 1999 (in Davis & Whittington nd)), Herrera & Post 2014) (Walker 1999).

Box 10. Approaches that have often been successfull and could be scaled-up and replicated (OECD 2011).

Improved enabling environments for private operator involvement has helped enhance the performance of water utilities in Armenia, Kazakhstan, Russian Federation and Georgia. OECD (2011) reports that in the Russian Federation, private operators have in many cases been 'agents of positive change' in the sector. However, authors such as Davis & Whittington (nd) caution about relying too greatly on PSP to play a significant role in water sector reform and instead encourage transition economies such as Uzbekistan to focus on creating adequate enabling environments before eliciting interest from private firms.

Drinking water and sanitation tariffs in the region are at or below 0.4 US$/m³ in seven of twelve ECA countries – insufficient to cover O&M costs (OECD 2011). Revenues from water sales in Uzbekistan are among the lowest in the ECA region and remain close to their 1990 levels.Uzbekistan has the lowest operating cost coverage ratio of the ECA countries – this is a financially unstable situation.

Lessons learned show that ECA countries should support the emergence of utilities whose operations can be financed by tariffs so that the governments can concentrate their support on capital investment and social protection. There appears to be scope in many ECA countries to raise tariffs further, if service quality improves, and in conjunction with targeted support for poorer sections of the population who would be adversely affected by such price increases. Analysis in Armenia showed that a certain level of tariffs and collection rate would allow covering O&M costs of the service in urban areas after a transition period. Additional analysis confirmed that this level of tariff was affordable for 90 percent of the population and helped design targeted measures to support the lowest decile that could not afford paying their water bills as well as other essential goods and services.

A critical priority in ECA countries consists of maintaining, renovating and in some cases, down-sizing infrastructure (when oversized assets are expensive to operate). OECD analysis found that in the ECA region, even if tariffs were increased up to an average of 5 percent of household income user charges would only generate about 50 percent of cash flow needs for the foreseeable future, going up to 95 percent by 2028. Therefore, prioritization of investments is recommended, starting with investments to reduce water related morbidity and halt the deterioration of existing infrastructure. Prioritizing investments in service levels and regions that generate the highest benefits at least cost (e.g. improved sanitation in rural areas) (OECD 2011) may be preferential.

The share of households in the ECA region with water meters is relatively low. Meters are most common in Moldova and Belarus (over 90 and 80 percent respectively) and just over 30 percent in Uzbekistan. Installing meters can be a costly and technically challenging undertaking (Davis & Whittington nd). Armenia has taken drastic actions to increase water metering. To that end, a water use metering strategy was designed and implemented. This helped reduce water consumption, water leaks, production costs, and increase collection rate.

To date, much international assistance and public domestic spending has been focused on large investments in major centers whereas many acute problems are in smaller centers and rural areas. Since the early 1990s, the situation in rural areas has improved remarkably in countries such as Armenia, Azerbaijan and Georgia, but has deteriorated in Uzbekistan.

While many of the ECA governments have been slow to react to the rural water situation, some such as the Kyrgyz Republic have developed a rural water sector policy. Also, Armenia initiated a national policy dialogue on Financing Rural Water Supply which helped identify realistic policy objectives for minimal water supply standards for rural populations, which are being incorporated in the legislative framework.

Decentralization has occurred in ECA countries to varying degrees and with varying levels of success. Box E2 in Annex E outlines common challenges encountered by decentralized WSS systems in ECA countries based on an ssessment by OECD / EAP Task Force (2009). **In some countries, decentralization has led to over-fragmentation with negative impacts, as utilities may be too small to operate, maintain and finance infrastructure needs**. In response, some countries have aggregated neighboring water utilities or created regional companies or even national companies. Several countries have commenced this reform, but Uzbekistan is among the countries that remain tied to the decentralized approach. In particular, Armenia, Georgia, the Kyrgyz Republic, Moldova, and Ukraine have moved towards some aggregation of the municipal water sector with the objectives of simplifying tariff regulation, attracting more finance for investment into the sector, generating economies of scale, and encouraging cross-subsidization of utilities. Regional operators are not necessarily the optimal option. Economies of scale and scope have to be considered for a country like Uzbekistan.

Source: OECD (2011), Ten Years of Water Sector Reform in Eastern Europe, Caucasus and Central Asia, OECD Publishing. http://dx.doi.org/10.1787/9789264118430-en

CONCLUSION AND RECOMMENDATIONS

8.

8. CONCLUSION AND RECOMMENDATIONS

141.This final chapter summarizes key conclusions from the Social Impact Assessment of current drinking water and sanitation service conditions in Uzbekistan. It also offers recommendations for re-orienting investment strategies in the WSS sector, sector financing and tariff reform. These can hopefully provide an input into discussions around WSS strategy development in Uzbekistan.

142.**Our findings suggest that there are serious and widespread drinking water and sanitation service inadequacies outside Tashkent. Large inequalities in service conditions and WSS expenditure burdens were witnessed in our sample**. According to official data only about half of households in the country have access to piped water in their homes or yard. We find that many of these households only receive water from these pipes for short periods per day, and experience pressure and water quality problems. As a consequence many of them also rely on other water sources, like pumps in their yards, and open water, just like households who are not connected.

143.**Rural households and those with low-incomes in particular experience hardship conditions with large amounts of them using open water sources for their drinking water needs**. In Raion centers households often rely on public standpipes which suffer from similar irregular supply and pressure and quality problems as the private pipes. The poorest 40 percent of the income distribution in our sample experience conditions that are much worse than the top 60 percent. Women bear a higher burden than men given that they are responsible for water collection. This can be a burden in particular for women in households relying on public standpipes for their water supply as these often face long transport and waiting times.

144.**Data gathered from the selected sites show that sanitation conditions are equally problematic if not worse, suggesting public health is at risk**. Only one fifth of households in our sample had a toilet inside their home. And none of the households in Raion centers and rural areas had a connection to a functioning sewerage network. Surveyed households reported elderly, children and disabled households find it difficult to venture outside to the put latrine, especially at night and in winter. Most households rely on a pit latrine with an earthen tank risking leakages of sewerage to ground water. This constitutes a health hazard for the many households who use drinking water from low cost shallow pumps in their yards. Serious health impacts of poor WSS conditions were reported even if many households claim they treat or boil their water.

145.**Households in the bottom 40 percent of the income distribution witness larger expenditure burdens for meeting their WSS service needs than the top 60 percent**. Households who receive the best WSS services (e.g. Tashkent residents) currently incur WSS costs that are much lower than those that receive the worst conditions Expenditure burdens are especially high for unconnected households in raion centers and oblast centers. That is because their overall expenditures are lower and many of them incur high coping costs for meeting their WSS needs including water pumps, water containers, water treatment chemicals, boiling water and costs for digging and emptying pit latrines.

146.**There are serious performance problems of utility firms and many were said to be unable to conduct repairs.** Water utilities in surveyed areas tend to be slow to respond to customer complaints, if at all. Vodokanal officials claim that they are severely indebted as low tariffs and technical and commercial losses lead to low cost recovery. Many vodokanals cannot afford even basic operating expenses. In addition, frequent power cuts are said to damage water pumps. In response, many residents have started to come together and initiate own repairs of WSS systems – often together with the Mahalla. Given that this was said to often be done without adequate technical supervision, WSS systems can become even more deteriorated.

147.**Respondents of our study indicated a willingness to pay higher monthly fees than they currently do for a continuous supply of quality water**. More than half of the poorest 40 percent of unconnected households are willing to pay UZS 100k to connect to a networked system. This figure is 200k for the top 60 percent. The median willingness to pay in terms of for recurrent costs for high quality WS services is UZS 14k per month for connected households and rural unconnected households. But households are only prepared to pay these amounts when the service improves.

148.**Schools were said to often lack reliable drinking water supply and sanitation conditions**. This affects in particular female students as latrines are often unisex with no piped water or hand washing facilities which can lead to girls, in particular adolescents, being absent from schools.

149.**The quantitative findings of this report are only approximate in nature, given the fairly small sample of 300 respondants that they is based on**. To obtain more robust statistics on the state of service conditions of drinking water and sanitation conditions in Uzbekistan a more comprehensive survey based on an expanded sample of housheolds across the country would be needed.

Recommendations

150.**Installing water meters** for consumers is a priority as it is likely to reduce wasteful consumption and thus help avert problems with low pressure, especially in summer. It will also provide incentives for vodokanals to improve their service, as consumers will only pay for the water they actually receive and consume. Our findings suggest that in many cases it will also reduce household water bills. Promoting water metering is already a government policy. However, it is important to improve communications on the benefits of metering and also to simplify bills to make it clearer for consumers what they pay for. Equal treatment of all households in the enforcement of payment of bills should receive more attention. Where individual metering is too expensive, water meters could be installed in the stairwells of apartment blocks. Metering groups of households could be an alternative to household-level metering, requiring a much smaller investment.

151.**Informing consumers in time about interruptions.** To address the unpredictability of supply through piped drinking water systems, there is a need for drinking water utilities to inform consumers in time about the water supply schedule and when interruptions can be expected. This is especially important for public taps as many households not connected to a supply system reply on this source, especially those in the bottom 40 percent of the income distribution.

152.**Utilities should become more responsive to consumer complaints.** It is important that the drinking water and sanitation Utilities become more responsive to consumer complaints about broken WSS infrastructure. Resources including staff should be made available for this. Water utilities should provide technical supervision of consumers and mahallas – sometimes together with private entrepreneurs – to conduct their own repairs on WSS systems. Regulations that facilitate the engagement of private parties in repairs of WSS infrastructure should be prepared. This could encourage households with high demand for improved water supply to organize and seek solutions to their water supply problems. Donors, perhaps in collaboration with local NGOs, could play an important role in organizing a "demand-responsive" program, including the dissemination of information to neighborhoods about the types of service improvements that are technically possible and the process by which households could obtain them.

153.**Investigate and address serious drinking water quality problems where these are reported.** Information gathered from many consumers for this study suggest that there are severe water quality problems from piped systems and from pumped groundwater outside Tashkent. This suggests that mechanisms for consumers to complain about water quality should be improved and that more regular and widespread quality tests of piped water and ground water should be conducted to investigate causes of contamination. Findings also suggest that regulations for preventing contamination of ground water by pit latrines should be strengthened and enforced. In areas where quality cannot be easily improved it will be important to provide residents with access to affordable home water treatment methods and information on water water-borne diseases and hygiene.

154.**Improve functioning of public taps and make their billing systems more transparent.** Public taps are an important source of drinking water for those that are not connected to a properly functioning water supply system and cannot afford bottled water. Many of them rely on rivers and lakes if public taps break down or are absent. Therefore, priority should be given to improving the functioning of public taps and ensure its water meets quality standards and its supply is reliable. The study findings also indicate that rules around payment for public taps should be clarified to make sure that only households that are likely to make use of these taps are charged.

155.**Improve accountability to consumers of Vodokanals and strengthen feedback from WSS consumers** to national and sub-national WSS decision makers and program providers. In order to design programs and policies that are based on the reality of conditions in the field, it is important to put in place a high quality feedback mechanism that collects information from consumers on their experiences and WSS service quality conditions. Such a mechanism could include a community monitoring system with support of local government to notify vodokanals of system repair needs and increase accountability of the vodokanal of their services. The participation of women in such community water management activities should be ensured and their role in water consumer groups and in positions in vodokanals and khokimyats should be strengthened. Women bear the greatest burden for poorly functioning WSS systems and should be included in the development of solutions.

156.**Reconsider the currently frozen tariff structure.** The study finds that those households who receive the best WSS services (e.g. Tashkent residents) currently incur WSS costs that are much lower than those that experience the worst WSS conditions. Respondents of our study indicated a willingness to pay higher monthly fees than they currently do, on the condition that services improve. There is also a strong willingness to pay by many households - that currently incur high coping costs for meeting

their WSS needs - to connect to a well- functioning WSS system. Our findings therefore suggest that there are opportunities to reconsider the currently frozen tariff structure. A mechanism should be considered that raises fees for those that currently receive high quality water and re-allocates these resources to provide services to those areas where households currently incur high private costs for meeting their WSS needs. Communication campaign should be conducted and agreements should be reached with consumer representatives on a 'compact' where tariffs are gradually raised while service quality is improved. Greater flexibility in payment schedules maybe needed, especially in rural areas where incomes are irregular and sometimes in-kind.

157.**Protect those that cannot afford higher fees**. While there are strong indications that households are willing to pay higher WSS fees provided WSS service conditions improve, our findings also suggest that some households may not be able to pay higher fees. Any effort to raise fees for high quality WSS services should therefore go hand in hand with well-targeted social transfers to those that may not be able to afford those. The introduction of block tariffs to protect low-volume consumers (assumed to be the poorest) should also be considered in areas where advanced meters have been installed.

158.**Prioritize investment in expanding networked drinking water connections to households that are currently *unconnected* and incur high costs for meeting their WSS needs tariffs.** This includes in particular households in Raion centers where expenditure burdens seem particularly high, and rural areas where a large proportion of households rely on open water sources for their drinking water and sanitation needs. There is also a need to improve service quality to *connected* households and invest in upgrading existing WSS infrastructure.

159.**Subsidize up-front connection costs rather than water tariffs**. Connection subsidies will be important for connecting those in that currently do not have a networked tap inside their home or yard and that are in the bottom 40 percent of the income distribution. Many of them currently use open water sources and may not be able to afford upfront payments for a connection. Even if poor households can only afford to use small amounts of water if tariffs are no longer subsidized, when they are connected to a reliable supply of water they will have ready access to a convenient source.

160.**Liaise with WSS sector counterparts in the region to learn from their experiences in reforming the WSS sector**. As referred to in Chapter 7 and Annex E there is considerable experience with reforming the WSS sector in some of the former Soviet countries such as Armenia, Georgia, Kyrgyz republic and also in Russia. The Uzbekistan government and utility company could visit their counterparts in some of these countries to learn from their reforms and build on their experiences. The World Bank in collaboration with other international financial institutions and donors could be approached for supporting such 'south-south' learning.

161.**Put in place regular high quality household expenditure surveys that include a utility services module that collects detailed information on quality of utility service conditions and household expenditures on meeting drinking water, sanitation and energy needs**. As said, the quantitative findings of this report are only approximate in nature and to obtain more robust statistics on the state of service conditions of drinking water and sanitation and other utility service conditions in Uzbekistan a more comprehensive survey based on an expanded sample of households across the country would be needed. Such a survey could help monitor the new sustainable development goals (SDGs) which in addition to 'access' to WSS services also monitor the quality and reliability of WSS and other utility services. Such a household survey would idealy be conducted on a regular basis by the national statistical office of Uzbekistan.
This would help establish a database of household consumption expenditures as well as expenditures on meeting WSS service needs (and other utility costs). This is essential for conducting ex-ante assessments of the impacts of any change in utility tariffs on different wealth groups. Micro data should be disseminated to policy researchers for advanced analysis.

REFERENCES

REFERENCES

ADB (Asian Development Bank), March 2012, *Developing of Strategy, Road Map and Investment Program for the WSS Sector of the Republic of Uzbekistan till 2020*, ADB-0131-UZB, Synthesis, Draft Final Report, March 2012, Egis Bceom International.

ADB, July 2013, *A Story within a Story, Gender and Water in Uzbekistan*, Asian Development Bank Publication Stock No. ARM135374-3 July 2013.

ADB, 2014, *Uzbekistan Country Gender Assessment*, Gender and Development / Central and West Asia / 2014.

Briscoe, J., 1999, *The Changing Face of Water Infrastructure Financing in Developing Countries*, International Journal of Water Resources Development, 15(3), pp.301–308.

Damme, H., Hans M.G. & White, A., 1984, *Technology Choices for the Decade*, In Water and Sanitation. Academic Press, pp. 151–172.

Davis, J. & Whittington, D., 2004, *Challenges for water sector reform in transition economies*, Water Policy 6 (2004) 381-395.

EAP Task Force, June 2011, *Water Utility Performance Indicator Database*, In OECD 2011.

Fankhauser, S. & Tepic, S. 2005, *Can poor consumers pay for energy and water? An affordability analysis for transition countries*, European Bank for Reconstruction & Development Working paper No. 92 Prepared in May 2005, London UK.

Fonseca, C., 2014, *Affordability of WASH services: rules of thumb and why it's difficult to measure*, Published on: 27/06/2014, IRC, www.ircwash.org/blog/affordability-wash-services-rules-thumb-and-why-it's-difficult-measure.

GoU, 2010, *Presidential Decree No. PP-1446 On the Acceleration of Development of Infrastructure, Transport, and Communication Construction in the Years 2011–2015*. 21 December, 2010.

Hutton, G., 2012, *Monitoring "Affordability" of water and sanitation services after 2015: Review of global indicator options* , A paper submitted to the United Nations Office of the High Commission for Human Rights , 20th March 2012 , Revised Draft

IKS (Islohotkonsaltservis Group), 2010, *Water Supply and Sanitation Services Investment: Tranche 2. Poverty and social assessment*. Tashkent: ADB.

Institute for Social Research (ISR), 2011, *Results of Sociologic Survey*. Second inception report. Tashkent (TA 7671-UZB). p. 38. Householdswere surveyed in the Navoi, Fergana, and Kashkadarya regions.

Kudat, A., Ozbilgin, B., Zholdasov, A. & Ilkhamov, A., August 15th 1996, Salinity Taste Tolerance Assessment, Uzbekistan: Water Supply, Sanitation and Health Project, Prepared by The Uzbek Social Science Network.

Mcphail, A.A., 1993. *The "Five Percent Rule" For Improved Water Service : Can Households Afford More?,* World Development, 21(6), pp.963–973.

Médecins Sans Frontières (MSF), nd, KARAKALPAKSTAN: A POPULATION IN DANGER, The impact of the Aral Sea disaster and a worsening economic climate on the health and wellbeing of the people of Karakalpakstan, Médecins Sans Frontières, Tashkent, Uzbekistan

OECD (2011), *Ten Years of Water Sector Reform in Eastern Europe, Caucasus and Central Asia*, OECD Publishing. http://dx.doi.org/10.1787/9789264118430-en

Prüss-Üstün A., Bos R., Gore F. & Bartram J., 2008, *Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health*. Geneva, World Health Organization. Social Center Tahlil, 2009, Research conducted by the Social Center Tahlil in the towns of Galaasiya (Bukhara region) and Karmana (Navoi region) and in the city of Termez in 2009, in ADB 2013.

Saunders, R. J. & and Warford, J.J., 1976. *Village Water Supply: Economics and Policy in the Developing World*. A World Bank Research Publication. Baltimore, MD: The Johns Hopkins University Press.

Small, I., Falzon, D., Van der Meer, J.B.W. & Ford, N., 2003, *Safe water for the Aral Sea Area, Could it get any worse?*, European Journal of Public Health 2003; 13: 87–89.

Smets, H. *Quantifying the affordability standard*, in *The Human Right to Water: Theory, Practice and Prospects.* 2012. Cambridge University Press.

SSCUZ (State Statistical Committee of the Republic of Uzbekistan), 2006, *Uzbekistan Monitoring the Situation of Children and Women, Multiple Indicator Cluster Survey 2006*, State Statistical Committee of the Republic of Uzbekistan, UNICEF, UNFPA

Waughray, D. & Moran, D., 2003, *Cost Recovery in Water and Sanitation Projects*, Volume 2 : Annexes to Main Report. Available at: http://r4d.dfid.gov.uk/PDF/Outputs/R7834annexes.pdf.

Whittington, D., August 2002, *Municipal Water Pricing and Tariff Design: A Reform Agenda for Cities in Developing Countries*, Sustainable Development, Issue Brief 02– 29.

Whittington & Hanemann (2006), *The Economic Costs and Benefits of Investments in Municipal Water and Sanitation Infrastructure: A Global Perspective*, Department of Agricultural & Resource Economics, UCB, CUDARE Working Papers, University of California, Berkeley, Year 2006 Paper 1027.

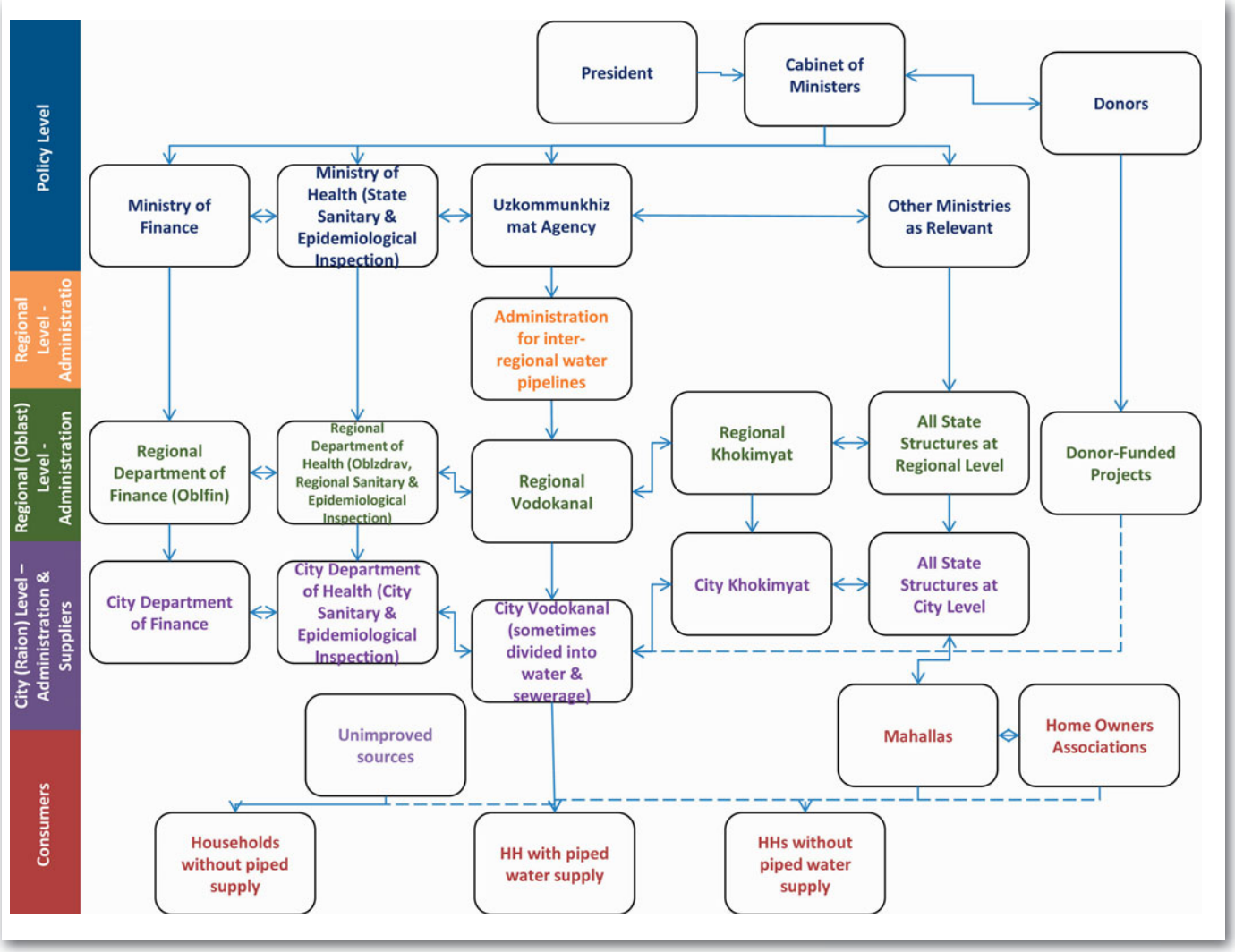
WHO, 2012, *GLAAS 2012 Report, UN-Water Global Analysis and Assessment of Sanitation and Drinking-Water, The Challenge of Extending and Sustaining Services.*

WHO/UNICEF Joint Monitoring Programme, 2013, *Progress on Sanitation and Drinking Water – 2013 Update*.

WHO/UNICEF Joint Monitoring Programme, 2006, *Meeting the MDG Drinking Water and Sanitation target, The urban and rural challenge of the decade.*

ANNEXES

ANNEX A. STAKEHOLDER MAP & STAKEHOLDER ROLES IN THE UZBEKISTAN'S WSS SECTOR



Government Administration

Cabinet of Ministers

The Cabinet of Ministers plays a major role and is responsible for the approval of relevant documents, for the supervision of UCSA and the Oblast administrations. Its mandate includes the development of regional economies and the improvement of living standards. It is the executive body of the Government of Uzbekistan and has the overall responsibility for monitoring the effectiveness of the economy and social spheres, including communal services and it controls the activities of all ministries, government and semi-government organizations including UCSA.

Regional Administration

Each Oblast is headed by a governor (Khokim) who represents the Government at the Oblast level. The Khokim is appointed or dismissed by the President of Uzbekistan and confirmed by the Counsel of Peoples' Deputies of the respective Oblast. The executive body at the regional level is the Oblast Khokimyats comprising the Khokimyat apparatus and ministry line departments. The Khokimyat structure includes the Khokim and four deputies: Agriculture and Water Resources; Construction, Communication and Communal Services; Economy and Social Issues; and Women. Usually the first deputy Khokim represents the main economic sector / activity of the Oblast.

District Administration
The district Khokimyat is headed by a Khokim who reports to the Oblast Khokimyat. The Khokimyat has a leading role in the public administration of the country. Approval, support and participation of the district Khokimyat is important for every development activity in the respective Raion. The Raion Khokimyat is appointed and dismissed by the Oblast Khokim and confirmed formally by the appropriate Council of Peoples' Deputies. The apparatus structure of each district consists of district Khokim, 3 deputy Khokims (economic issues, spirituality and enlightenment and women's issues); the main specialists, organizational and control group and chancellery.

City Administration
The role of the city Khokimyat is the public administration body in the country with a role similar to the role of the Raion Khokimyat, to which the city Khokimyat is subordinated. The head of the city Khokimyat is the Khokim who is the highest official on the territory. City Khokimyats usually include several urban mahallas.

Local level Administration

Mahalla Committee
The mahalla committee is the lowest organ of local self-government and the one linked directly to households. They affect all aspects of the social life of local community members and bring residents together, helping to solve their problems. Mahallas act as intermediaries between public authorities and residents. The committee is made up of four members: the chairperson who is elected by the mahalla households for 2.5 years, the secretary who is selected by the chairperson, the 'posbon' who is responsible for security and is appointed by the district Department of the Interior, and the women's advisor who is nominated by the District Women's Committee. The mahalla committee is directly accountable to the district Khokimyat. In urban-type settlements, the mahalla committee is supported by volunteers who have been selected by the local people jointly with the mahalla committee. In each mahalla committee, several sub-committees may be established to support the work of the mahalla committee, such as for youth, crime prevention, municipal / land improvement etc. In practice, committees are established based on the actual needs and priorities of the respective mahalla and usually deal with the resolution of family conflict, pension distribution, resolving women's issues, organizing weddings, funerals and other social events. Specific to WSS matters, they can assist vodokanals in recovering payments for services (including those in arrears), promote efficient water use and in principle should notify residents of any formal changes in utility (water, gas, electricity) schedules. Mahallas may also provide financial assistance to low-income families to help them pay for utility services. In some areas (e.g. Beruni and Dustlik), mahalla committees were also reportedly trying to help raise funds and coordinate improvements in the delivery of WSS services.

Home Owners Association (HOA)/ Shirkats
The HOA / shirkat coordinates activities for a residential building. Residents often refer issues with building conditions to the HOA (which they sometimes call a 'shirkat', although this is generally a term applied to agricultural cooperatives) if they cannot solve problem themselves. While HOAs have responsibility for building level issues, they do not have any particular capacity related to solving WSS problems.

Water supply

Uzbekistan Communal Services Agency (UCSA) (Uzkommunxizmat)
UCSA emerged from the dismantling of the former Ministry of Communal Services and has the overall task of improving water supply services in the country. Its main goal is to set up financially viable urban and district water supply and communal services. The Cabinet of Ministers nominates UCSA's Director General and the First Deputy Director General. UCSA's main tasks include providing regulatory advice to support reforms in the communal services sector; monitoring the compliance of local authorities and commercial entities with sector policies, and attracting foreign investment into the water supply and sanitation sector. UCSA, as the executing agency of the Program, is a key stakeholder and has a primary interest as a specialized Government authority responsible for the development and implementation of the water supply policy. The role of UCSA will be a leading one in planning, implementation and monitoring of the Program at all stages.

Oblast Vodokanal
The Vodokanals are the service provider for drinking water responsible for the construction, operation and maintenance of the water supply to ensure an uninterrupted supply of clean water to clients in the Oblast. The Oblast Vodokanal coordinates and monitors the activities of the district Vodokanals within the Oblast. The district Vodokanals report to the Oblast Vodokanals and

submit periodic financial and operational reports such as income statements, cash flow, balance sheet as well as production and consumption data. The Oblast Vodokanal consolidates these reports for submission to the Oblast Khokimyat.

District Center Vodokanal

The district center Vodokanal operates and maintains the water supply system in the district centers and the adjacent settlements. Its activities are coordinated by the Oblast Vodokanal. The district center Vodokanal submits monthly and annual reports to the Oblast Vodokanal. The district center Vodokanal is fully responsible for the provision of clean drinking water to all clients on its territory. It is also responsible for addressing and responding to issues raised by clients and their representatives and has the right to collect water fees for providing water as per contracts with its clients. Activities include the operation of the water supply systems and the maintenance of the water pipe connections. They must also resolve situations of conflict regarding water supply and payments.

Directorate of Interregional Trunk Mains – DITM (under UCSA)

The responsibility for construction, operation and maintenance of interregional water transmission pipelines lies with the Directorate of Interregional Trunk Mains. These mains distribute water to urban centers, which are responsible for operating the local distribution networks. The DITM has also established regional water supply systems, which distribute water and collect fees from clients.

Tarrifs

Ministry of Finance and its regional representatives

OECD (2011) reports that the state adjusts the price of water services delivered by natural monopolies. The State Committee on De-monopolisation, Competition and Business Support, jointly with the Ministry of Finance, supervise the activities conducted by natural monopolies. The Ministry of Finance is under the supervision of the Cabinet of Ministers and delegates the right to set utility tariffs (including water supply) and their threshold levels to financial departments of regional kkhokimyats. The water tariffs are often raised incrementally. There are several areas of interest for the MoF in the program including facilitating regional development through new investments, setting up tariffs at cost-recovery levels and supporting a transparent and accountable system of financial management.

Quality

Ministry of Health

MOH is under the supervision of the Cabinet of Ministers and is responsible for implementing government policy related to improving the health of the population and the development of sanitation norms and rules as well as the monitoring of controls. MOH is play an important role at local levels in developing and implementing the Sanitation and Hygiene Promotion Program to reduce the incidence of water-borne disease especially in children.

State Sanitary and Epidemiology Inspectorate (SSEI)

The SSEI is chaired by the chief state Sanitary Doctor who is equivalent to a Deputy Minister of Health. The SSEI provides the procedural guidelines and supervision of the Sanitary Epidemiological Stations. The SSEI undertakes sanitary inspections on behalf of the Government to ensure compliance with norms and standards for sanitary and hygiene rules. It has the right to inspect all institutions, organizations and private businesses. The SSEI is responsible for the implementation of sanitary and epidemiological measures and sanitary controls including control of drinking water supplies.

ANNEX B. METHODOLOGY AND SAMPLING STRATEGY

The research methodology consisted of a mix of qualitative and quantitative data collection methods, detailed below.

Qualitative Instruments

The four qualitative instruments used in the study are outlined below.

Desktop review and stakeholder mapping. A thorough desktop review of available information on the WSS sector in Uzbekistan was conducted. Major international outputs such as the Joint Monitoring Program (JMP), the Multiple Indicator Cluster Survey (MICS)[34] and various studies by organizations such as the ADB, OECD and MSF informed this report. Uzbekistan government documents and data, as well as international scientific articles were also referenced. The major stakeholders and their roles and interactions in the Uzbekistan WSS sector are provided in a map and summary in Annex A.

Individual interviews (IDIs). Nineteen (19) IDIs with service delivery stakeholders were conducted. These were semi-structured interviews, with an objective to obtain a supply-side perspective and to understand the interaction between customers and service delivery organizations / personnel. IDI guides were created to cover topics of interest. The duration of each IDI was 40 minutes or less.

Focus group discussions (FGDs). Seventeen (17) (FGDs) were conducted, ranging in size from approximately six to twelve participants from households in the survey areas. FGD guides were created to cover topics of interest and local consulting firm staff were trained in delivering FGDs and encouraging active participation by all participants. Most FGDs were mixed based on recommendations from the local consulting firm. Only in some rural areas were female-only focus groups considered necessary to ensure that the female voice on WSS-related issues was captured. The duration of each FGD was 1.5 hours or less.

Mini case study case studies. Ten (10) mini case study interviews were undertaken in households and in public buildings (schools and medical centers). Mini case study interview guides were prepared to cover topics of interest. Interviewers spent a couple of hours with interviewees observing their use of water and sanitation facilities and associated activities. Photographs were taken of WSS facilities (with the participants' permission).

Quantitative Instrument

Two household surveys were prepared: (i) for connected households, and (ii) for unconnected households. The connected household survey consisted of 94 questions and the unconnected household survey consisted of 63 questions. Each survey was designed to take approximately 45 minutes. Each survey was prepared in English and translated into Russian and surveys were conducted in Uzbek and Russian languages as preferred by respondents. Surveys were pilot tested in Anhangaran Province in March 2014 and 300 households were surveyed at full scale during April and May 2014.

The surveys covered a number of key topics relevant to the study objectives, including: (i) the current status of WSS access, water use patterns and service quality; (ii) coping strategies employed to deal with the lack of access to WSS service or poor quality; (iii) water and sanitation expenditures (including non-monetary costs) and affordability of WSS services; (iv) interactions between consumers and service providers, and (v) willingness and capacity to pay for access to improved WSS services. In order to enable the construction of a welfare estimate, surveys asked information on household asset ownership and for respondents to estimate their average monthly household expenditures in summer and winter (see Box A). For the purpose of analysis, the bottom 40 percent of households – the most vulnerable as determined by household asset welfare measure – are distinguished[35].

The surveys employ two broad categories of approaches (as described by Devicienti et al. 2004) to compute the value to consumers of potential reforms in the provision of WSS services:

1. The *'revealed preference in surrogate market approach',* which is based on what people "do" to cope with the absence of a market for the good they need; hence, it is also named the *coping cost method* or the *averting expenditure method.* It relies on the observed behavior toward some market good that possesses a connection to a non-marketed good of interest. It estimates the time and financial costs of current household behavior (monetary and non-monetary costs); and

34 MICS is a nationwide periodic survey which depicts the status of women and children in Uzbekistan. It is implemented by the State Statistical Committee (SSC). The 2006 MICS covered 10,500 households in all regions of the country.

35 In Uzbekistan, there are no reliable poverty measures so for the purposes of analysis the study defined the bottom 40 percent as those most vulnerable. The top 60 percent are referred to as the 'non-poor'.

ANNEX B. METHODOLOGY AND SAMPLING STRATEGY

2. The *'stated preference approach',* which is based on what people say when they are asked directly about a good in question; this is often referred to as *contingent valuation* (CV). It relies on answers to specifically designed surveys relating to a non-market good in order to understand the basis of the demand. It determines the maximum willingness of individual households to pay for various options for level of service and payment arrangements within the context of the current or specified institutional regime. Respondents' willingness to pay may be far below the costs of providing improved services or closer to the full economic costs of providing water.

Survey questions on household consumption expenditure aimed to assess household wealth levels. However, the expenditure module in the household survey was not comprehensive as it did not include detailed food expenditure breakdowns. It instead focused more on utility expenditures. For that reason, an asset index was calculated (see Annex G).

Sampling Strategy

For the purposes of both qualitative and quantitative research instruments, and households that were connected and unconnected to a networked system were sampled from four main settlement types. These were (i) Capital City (Tashkent), (ii) Oblast (Province) Center, (iii) Raion (District) Center, and (iv) Rural Area. Connected and unconnected households across those settlement types were sampled from four geographical regions (South Karakalpakstan, Jizzak, Fergana, and Tashkent city)[36]. The sampling matrix used in the study is provided below.

Table B1. Sampling matrix formal household survey (households)

	Region	Settlement Types				
		Tashkent	**Oblast centers**	**Raion centers**	**Rural areas**	**Total**
Connected	Tashkent	30 (Tashkent city)				30
	West (Karakalpakstan)		20 (Nukus city)	10 (Beruni center)	10 (Beruni raion)	40
	Central (Jizzak)		20 (Jizzak city)	10 (Dustlik center)	10 (Dustlik raion)	40
	East (Fergana)		20 (Fergana city)	10 (Tashlak center)	10 (Tashlak raion)	40
	Total	**30**	**60**	**30**	**30**	**150**
Not Connected	West (Karakalpakstan)		10 (Nukus city)	20 (Beruni center)	20 (Beruni raion)	50
	Central (Jizzak)		10 (Jizzak city)	20 (Dustlik center)	20 (Dustlik raion)	50
	East (Fergana)		10 (Fergana city)	20 (Tashlak center)	20 (Tashlak raion)	50
	Total		**30**	**60**	**60**	**150**
	Grand total	**30**	**90**	**90**	**90**	**300**

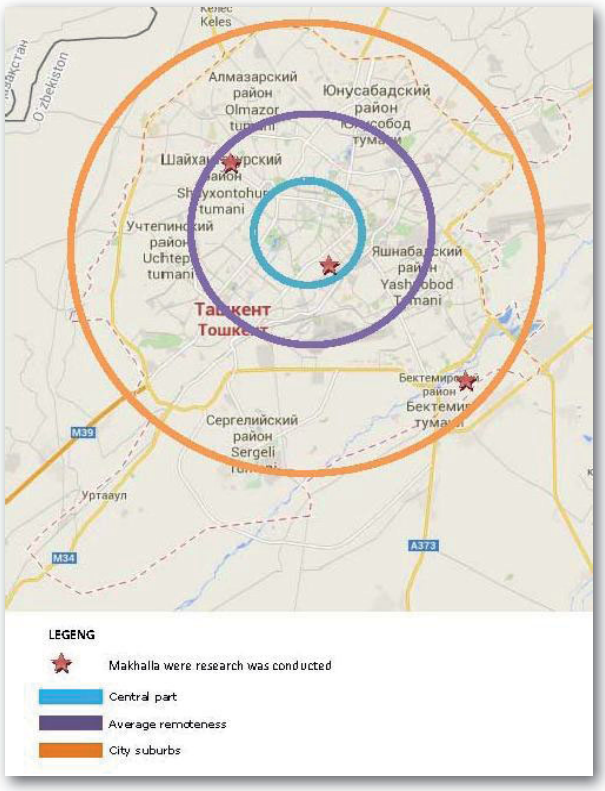
Sampling domains were not proportional to the distribution of the population, and therefore the sample is not a self-weighting. The sampling methodology was 'purposive', as it sought to include a number of sites that represent a range of typical conditions and sub groups in Uzbekistan. As the research regions were not randomly selected, the formal survey data cannot be taken as representative for the country as a whole, but instead indicative of situations experienced by connected and unconnected households in different sample regions and in different settlement types across the country. A breakdown of the primary sampling units is provided below.

36 Similar geographical distinctions were defined by the Multiple Indicator Cluster Survey (2006) and Government of Uzbekistan / ORC Macro (2004) study for surveying purposes.

Tashkent

Sampling in Tashkent was conducted only in the central part of the city (not surrounding suburbs) (see map). A total of 30 households were surveyed, 1 focus group discussion, 2 individual interviews and 1 caset study interview.

Capital city (Tashkent) sample areas



(TO BE FILLED OUT BY THE RESEARCHER BEFORE INTERVIEW)

Number of the questionnaire |____|____|____|

The quota ***City*** ***1***

Regional city ***2***

Rural area ***3***

The exact address of HH

Type of accommodation

Connected to WC system *YES à CONTINUE INTERVIEW*

NOà FINISH THE INTERVIEW

Date of interview: Day |____|____| *Месяц* |____|____|

*Interviewer: surname*_____ *sign*_____ *№*____

*Encoding: surname*_____ *sign*_____ *№*____

*Operator: surname*_____ *sign*_____ *№*____

Name of respondent: _____

Contact phone number: (+998) _____

Gender of respondent (by observation):

Age of the respondent:

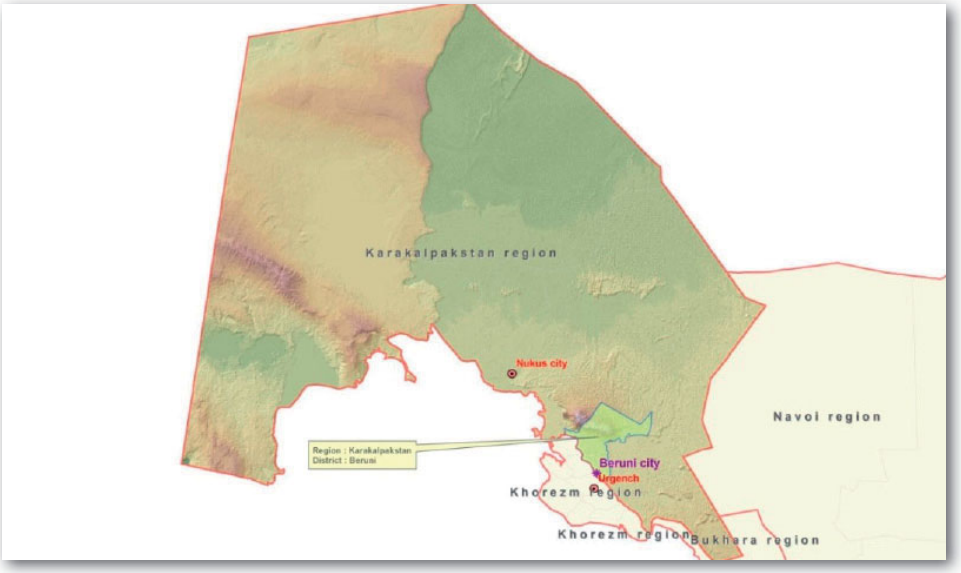
Is this your principal residence? *(DO YOU RESIDE HERE MORE THAN 6 MONTHS A YEAR?)*

ANNEX B. METHODOLOGY AND SAMPLING STRATEGY

Karakalpakstan

Sampling in the western region was conducted in the Autonomous Republic of Karakalpakstan. A total of 90 households were covered in the formal quantitative survey, while 6 focus group discussions, 6 individual interviews and 3 mini case study interviews were conducted. Surveys and qualitative instruments were conducted in Nukus Oblast center (20 connected and 10 unconnected households), Beruni Raion center (10 connected and 20 unconnected households) and Beruni rural area (10 connected and 20 unconnected households).

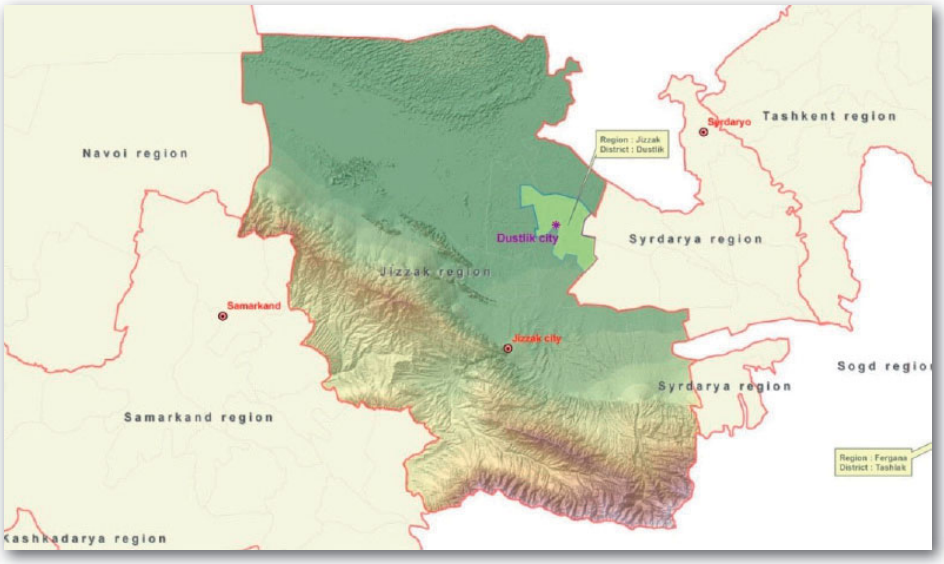
South Karakalpakstan sample areas



Jizzak

Sampling in the central region was conducted in Jizzak Oblast. A total of 90 households were covered in the quantitative survey. In addition, 5 focus group discussions, 6 individual interviews and 3 mini case study interviews were conducted. The quantitative surveys in Jizzak Oblast center covered 20 connected and 10 unconnected households, in Dustlik Raion center 10 connected and 20 unconnected households and in Dustlik rural area 10 connected and 20 unconnected households.

Jizzak sample areas



Fergana

Sampling in the eastern region was conducted in Fergana Oblast. A total of 90 households were surveyed as part of the quantitative assessment. In addition, 5 focus group discussions, 5 individual interviews and 3 mini case study interviews were held. The quantitative survey was conducted in Fergana Oblast center (20 connected and 10 unconnected households), Tashlak Raion center (10 connected and 20 unconnected households) and Tashlak rural area (10 connected and 20 unconnected households).

Fergana sample areas

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

HOUSEHOLD QUESTIONNAIRE

(network connectivity)

The project "Water supply and sanitation social impact assessment – Uzbekistan"

Conversation with a member of the HH at the age of 18, who is aware of the state of water and sanitation services and the costs associated with them.

(TO BE FILLED OUT BY THE RESEARCHER BEFORE INTERVIEW)

Number of the questionnaire |____|____|____|

The quota **City** **1**
Regional city **2**
Rural area **3**

TOWN/VILLAGE	Index _____

The exact address of HH

Street	
House	№
Flat	

Type of accommodation

Apartment in the apartment house (ground floor)	1	☐ to the question **G**
House or a cottage on the site ("Hawley")	2	☐ to the question **I**
Other to WRITE IN		☐ to the question **I**

Connected to WC system YES → CONTINUE INTERVIEW

NO→ FINISH THE INTERVIEW

Date of interview: Day |____|____| Месяц |____|____|

Interviewer: surname _____ sign_____ № ____

Encoding: surname _____ sign _____ № ____

Operator: surname _____ sign _____ № ____

Name of respondent: _____

Contact phone number: (+998) _____

Gender of respondent (by observation):

1. Male	**2. Female**

Age of the respondent:

|___|___|___| **years old**

Is this your principal residence? (DO YOU RESIDE HERE MORE THAN 6 MONTHS A YEAR?)

1. Yes	2. No → FINISH THE INTERVIEW

My name is _____ and I am working with a team of researchers on behalf of the World Bank investigating water and sanitation issues as they relate to your household. We are interviewing a number of households in your area and other areas of Uzbekistan. We are interviewing a number of households in your area and other areas of Uzbekistan.

Specify the most important sources of water for HH. INT: ASK THE RESPONDENT ABOUT THE HOUSEHOLD'S MOST IMPORTANT WATER SOURCES.FILL OUT THE COLUMN FOR EACH SOURCE SPECIFIED BY RESPONDENT SOURCES.

			1. Piping from source inside home (internal tap)	2. Piped water supply inside yard (outside tap)	3. Piped water outside yard (on the street, neighbors, in the other village)	4. Hand pump/ pump in the yard	5. Hand pump /outside yard	6. Rainwater collected	7. River, lake, pond, the other natural reservoir	8. Canal for irrigation	9. Channel for drainage	10. The tanker truck	11. Buying bottled water	Other (please specify). _____
1. Purpose/s that source is used for. FOR THE LAST YEAR	1.1.	Drinking	1	2	3	4	5	6	7	8	9	10	11	
	1.2.	Cooking / Dishwashing	1	2	3	4	5	6	7	8	9	10	11	
	1.3.	Bathing / Showering	1	2	3	4	5	6	7	8	9	10	11	
	1.4.	Laundry / Cleaning	1	2	3	4	5	6	7	8	9	10	11	
	1.5.	Garden	1	2	3	4	5	6	7	8	9	10	11	
	1.6.	Farming	1	2	3	4	5	6	7	8	9	10	11	
	1.7.	Other, please specify	1	2	3	4	5	6	7	8	9	10	11	
2. Average days per week source is available FOR THE LAST MONTH	2.1.	7 days per week	1	2	3	4	5							
	2.2.	5-7 days per week	1	2	3	4	5							
	2.3.	2-5 days per week	1	2	3	4	5							
	2.4.	<2 days per week	1	2	3	4	5							
3. Daily period/s of availability to household FOR THE LAST MONTH	3.1.	All the time	1	2	3	4	5							
	3.2.	00:00 - 01:00	1	2	3	4	5							
	3.3.	01:00 - 02:00	1	2	3	4	5							
	3.4.	02:00-03:00	1	2	3	4	5							
	3.5.	03:00 - 04:00	1	2	3	4	5							
	3.6.	04:00 - 05:00	1	2	3	4	5							
	3.7.	05:00 - 06:00	1	2	3	4	5							
	3.8.	06:00 - 07:00	1	2	3	4	5							
	3.9.	07:00 - 08:00	1	2	3	4	5							
	3.10.	08:00 - 09:00	1	2	3	4	5							
	3.11.	09:00 - 10:00	1	2	3	4	5							
	3.12.	10:00 - 11:00	1	2	3	4	5							
	3.13.	11:00 - 12:00	1	2	3	4	5							
	3.14.	12:00 - 13:00	1	2	3	4	5							
	3.15.	13:00 - 14:00	1	2	3	4	5							
	3.16.	14:00 - 15:00	1	2	3	4	5							
	3.17.	15:00 - 16:00	1	2	3	4	5							
	3.18.	16:00 - 17:00	1	2	3	4	5							
	3.19.	17:00 - 18:00	1	2	3	4	5							
	3.20.	18:00 - 19:00	1	2	3	4	5							
	3.21.	19:00 - 20:00	1	2	3	4	5							
	3.22.	20:00 - 21:00	1	2	3	4	5							
	3.23.	21:00 - 22:00	1	2	3	4	5							
	3.24.	22:00 -23:00	1	2	3	4	5							
	3.25.	23:00 -00:00	1	2	3	4	5							

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

			1. Piping from source inside home (internal tap)	2. Piped water supply inside yard (outside tap)	3. Piped water outside yard (on the street, neighbors, in the other village)	4. Hand pump/ pump in the yard	5. Hand pump /outside yard	6. Rainwater collected	7. River, lake, pond, the other natural reservoir	8. Canal for irrigation	9. Channel for drainage	10. The tanker truck	11. Buying bottled water	Other (please specify). _____
4.	Predictability of source availability	4.1. Unpredictable	1	2	3							10		
		4.2. Predictable	1	2	3							10		
5.	Quality of source FOR THE LAST YEAR	5.1. No quality problems	1	2	3	4	5	6	7	8	9	10		
		5.2. Bad taste	1	2	3	4	5	6	7	8	9	10		
		5.3. Bad odor	1	2	3	4	5	6	7	8	9	10		
		5.4. Bad color	1	2	3	4	5	6	7	8	9	10		
		5.5. Salty	1	2	3	4	5	6	7	8	9	10		
		5.6. Presence of particles, turbidity	1	2	3	4	5	6	7	8	9	10		
		5.7. Presence of bacteria / viruses	1	2	3	4	5	6	7	8	9	10		
		5.8. Other, please specify	1	2	3	4	5	6	7	8	9	10		
6.	Treatment required. FOR THE LAST YEAR	6.1. No treatment required	1	2	3	4	5	6	7	8	9	10		
		6.2. Sterilizing with chemicals	1	2	3	4	5	6	7	8	9	10		
		6.3. Filtering	1	2	3	4	5	6	7	8	9	10		
		6.4. Boiling	1	2	3	4	5	6	7	8	9	10		
		6.5. Sun exposure	1	2	3	4	5	6	7	8	9	10		
		6.6. Let it stand	1	2	3	4	5	6	7	8	9	10		
		6.7. Other, please specify	1	2	3	4	5	6	7	8	9	10		
7.	Seasonal variation in source quality FOR THE LAST YEAR	7.1. Yes	1	2	3	4	5		7	8	9	10	11	
		7.2. No	1	2	3	4	5		7	8	9	10	11	
8.	Average volume of water used daily FOR THE LAST MONTH													
9.	Distance from the source	9.1. Till 50 meters			3	4	5		7	8	9			
		9.2. From50-500 meters			3	4	5		7	8	9			
		9.3. From 500 till 1 km			3	4	5		7	8	9			
		9.4. From 1 км till5 km			3	4	5		7	8	9			
		9.5. Over 5 km			3	4	5		7	8	9			

10. Specify please how long you have water piped to your household? (Int. only one answer)

1	2	3	4	5	6	7
Less than 6 months	6 months – 1 year	1 year	1-2 years	2-5 years	5-10 years	More than10 years

11. Did you pay for piped water supply during the last 12 months?

1. Yes	2. No → *go to question №13*

12. How much do you pay monthly ON AVERAGE for piped water supply?

Fill in|___|___|___||___||___||___||___||___||___||___||___|сум/ месяц

13. How do you pay your bill? (INT. SEVERAL ANSWERS ARE POSSIBLE)

Through the the bank - cash	1
In the the bank - by plastic card	2
In the Vodokanal - in cash	3
In the Vodokanal - by plastic card	4
Cash to a collector	5
At the post office	6
Paynet	7
Deductions from salary of one member of HH	8
Other, please specify _____	

14. How the fee for piped water supply is being calculated and by what tariff rate do you pay for HH?

By the water meter in HH	1	_____soum/м^3	
By the number of people in HH	2	_____ for 1 person, soum	
By the section of the pipe and the potential transmission capacity	3		
By the presence of sewage	4		
By the presence of a bath / shower	5		*Go to question № 17*
Not paying for tap water	98		
Other Fill in _____			
NOT SURE	99		

15. When was the water meter installed in your DH?

1	2	3	4
In the past year	During the last 5 years	Over 5 years ago	Not sure

16. Do you think that it measures exactly m3?

1. Yes *Go to question №18*	2. No	3. Not sure

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

17. Would you like to have a water meter, which measure your actual (exact) consumption of tap water? (INT. SEVERAL ANSWERS ARE POSSIBLE)

1. Yes		2. No		3. Not sure/Undecided
Saving money	1	Nobody proposed to establish water meter	1	
I do not trust the tariff rate by norm	2	Good water meter is expensive for HH	2	
Tariff rate is overvalued relatively to services	3	Cheap water meter deteriorates quickly	3	
I have a large number of people in the family	4	Water pressure will decrease due to a water meter	4	
Other to Fill in_____	5	Other to Fill in_____		

18. Specify what the water pressure in your HH in summer / winter?

		In summer	In winter
1	Strong pressure	1	2
2	Normal pressure	1	2
3	Weak pressure	1	2
4	Undecided	1	2

19. What is the minimum number of hours of service, per day, you need to have enough water to meet your needs? I.e REAL NEEDS! INT. FOR THOSE WHO HAVE 24 HOUR WATER SUPPLY DO NOT ASK THIS QUESTION.

Fill in |___|___|___|hour/day

20. If you sometimes use a secondary source of water, why piped water does not fully meet your needs? (INT: TICK ALL THAT RELATE TO COLD WATER, THIS QUESTION IS FOR THOSE WHO HAVE A SECONDARY SOURCE)

Service disruptions	1	
Available only a few hours per day	2	
Insufficient pressure	3	
Unsafe to drink	4	
Poor taste	5	
Do not use a secondary source	6	*Go to question* № 22
Other, fill in:_____		

21. How often do you rely on a secondary source for drinking purposes? (INT. SEVERAL ANSWERS ARE POSSIBLE)

More than once a week	1
Once a week	2
Once a month	3
Once every 3 months	4
At least once every 6 months	5
Never	6

22. From what infrastructure depends an availability of water? INT: RECORD ALL THAT RELATES AND READ ANSWERS

Infrastructure of the utility company - Vodocanal	1
Infrastructure cellars (for multistory buildings – common standpipes)	2
Household infrastrucure	3
Other, specify:_____	

23. From what factors depends tripping of water in yor HH?

		Strongly depends	Medium depends	Does not depend
1	From of electricity	1	2	3
2	From Vodokanal - redistribution between areas	1	2	3
3	From the neighbors when they make an extensive water use	1	2	3
4	Due to repair of system	1	2	3

24. Do you live at the same address as 5 years ago?

1. Yes	2. No → *Go to question 29*

25. Are conditions of water supply and sanitation services in your household better now than 5 years ago? (INT. SELECT ANSWER QUESTION BELOW AND FILL IN ACCORDANCE WITH SELECTED RESPONSES)

1. Yes, it is better		**2. No, worse**		**3. Did not change**	**4. Not sure**
26. Specify the reasons for improving the water supply and sanitation systems in your DH?		**27. Specify the reasons for worsening water supply and sanitation conditions in your DH?**			
The quality of sources improved	1	The quality sources worsened	1		
Availability of sources of improved	2	Availability of sources worsened	2		
Access to water is now easier	3	Access to water is now harder	3		
Burden of the collection / storage now lower	4	Burden of the collection / storage now higher	4		
Services of Vodokanal now cheaper	5	Services Vodokanal now more expensive	5		
Now fewer health problems due to the Vodokanal	6	Now more health problems because of the Vodokanal	6		
The quality of water services became better	7	The quality of water services has become worse	7		
Other, please specify _	8	The piping system is outdated	8		
		Other, please specify _			

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

Who does the following in your household? INT: SPECIFY ALL THAT RELATES.

28. Cooking	**1.** Males 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Boys >18; **6.** Girls>18.
29. Dishwashing	**1.** Males 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Boys >18; **6.** Girls >18.
30. Laundry	**1.** Males 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Boys >18; **6.** Girls>18.
31. Cleaning	**1.** Males 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Boys >18; **6.** Girls>18.

SANITATION

32. Where is your toilet? (INT. SEVERAL ANSWERS ARE POSSIBLE)

Inside the house	1
Outside the house, but within the yard	2
Out of the house, on public area	3
Other, please specify _____	

33. What kind of toilet do you use more often?

Flush toilet / bowl connected to a piped water supply and sanitation	1 go to question № 38
Flush toilet / bowl connected to the waste pit	2
Flush toilet / Bowl, not connected to the insulated tank with a leak into the ground	3
Shared with neighbors toilet in the yard	4
Toilet in a private yard	5
No toilet (open defecation)	6
Other, please specify	

34. Specify why you are not connected to a piped sanitation network?

No piped sanitation network connection	1
Not have enough funds at DH for connection to piped sanitation network outside the house	2
Not have enough funds to connect to a piped sanitation network in HH	3
There are not enough funds from other HH (neighbors) to connect to the piped sanitation network outside the house	4
Specify other._____	5

35. Where empties a sanitation construction? (INT. READ OPTIONS ANSWERSБ TICK ONLY ONE)

Concrete septic tank	1
Earthen septic tank	2
Lined pit	3
Unlined pit	4
Drain	5
Channel	6
Irrigation ditch near the house	7
Don't know	8
Other, please specify _____	

36. Would you like to connect to the sanitation pipe? INT. GO TO QUESTION № 38

1. Yes	2. No

ONLY FOR HH WHOSE TOILET IS OUTSIDE OF THE HOUSEHOLD

37. If the sanitation facility is located outside the household, do women feel safe to use sanitation facilities at night time?

1. Yes, very scared	2. Yes, it is not safe	3. No, we used to	4. Other, please specify

FOR ALL HHs

38. Is sanitationage facility used by other households?

1. Yes	**2. No** → *go the question 40*

39. If yes, how many households use them?

Fill in: |___|___|___| **households**

40. How often do you wash your hands after going to the toilet?

Always	1	*go the question 42*
Often	2	
Never	3	
Don't know	4	
Sometimes, not always	5	

41. If not always, why?

Not necessarily	1
Forgeting	2
No such habits	3
No facilities for hand washing	4
Not enough water	5
Other, please specify _____	

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

42. Describe the main problems in work of the toilet? (INT. SEVERAL ANSWERS ARE POSSIBLE)

No problems	1 go to question №44
Blockages	2
Low water pressure to flush	3
Odor	4
No possibility to use the sanitation when blockages at neighbors	5
Rapid filling of pits	6
Expensiveness of the cleaning pits	7
Not safe for children	8
Other, please specify _____	

43. Do you think that these problems are due to the infrastructure of public utilities or infrastructure of apartments / household? INT: SPECIFY ALL THAT RELATES.

Utility infrastructure	1
Infrastructure cellars (multistory buildings - general standpipes)	2
Households infrastructure	3

COSTS / MATERIAL COSTS FOR HOUSEHOLD SERVICES FOR WSS SERVICES

44. Please tell how much is the cost of your HH presented below on municipal services?

	Expenses		Un deci ded	**Cost UZ soum**
1.	Electricity / month	winter	1	_____th. soum
		summer	1	_____ th. soum
2.	Gas / month (seasonal) / month	winter	1	_____ th. soum
		summer	1	_____ th. soum
3.	Drinking water (tap, bottled, from tanker truck or other source) / month	winter	1	_____ th. soum
		summer		_____ th. soum

45. Please tell how much was spent ALL of your household per month on average:

	Name		**Un deci ded**	**TOTAL expenses**
1.	Total expenses (Int. INDICATE ALL COSTS OF HH FOR ALL NEEDS)	winter	1	_____th.soum
		summer	1	_____th.soum

46. Indicate all expenses related to providing water HH in the past year? INT: FILL ONLY RELEVANT POINTS.

Action	None	Cost UZ soum
1. Expenses on pump / hand pump / month	1	_____ th.soum
2. Payment for water from tanker truck / month	1	_____ th.soum
3. Bottled water / week	1	_____ th.soum
4. Buying water from friends' households / week	1	_____ th.soum
5. Water treatment (processing, filtering, etc.) / year	1	_____ th.soum
6. Payment for attending public bath / month	1	_____ th.soum
7. Fuel for transport for bringing water / month	1	_____ th.soum
8. Other, please specify _____	1	_____ th.soum

47. Which one-off expenses you had on your water supply system??

Action	None	Cost UZ soum
1. Constructing groundwater well	1	_____ th.soum
2. Livestock for transporting water	1	_____ th.soum
3. Piping from the source to the household	1	_____ th.soum
4. Below-ground tanks for storage of water	1	_____ th.soum
5. Tanks for the transport of water	1	_____ th.soum
6. Water storage tanks	1	_____ th.soum
7. Other, please specify _____		_____ th.soum

48. Specify any expenses related to sanitation system? INT: SPECIFY ALL THAT RELATES

Action	Cost UZ soum
1. Cleaning out of pit /septic tank (by contractor or household) 1.1. Once in year 1.2. 3-Monthly 1.3. 6-Monthly 1.4. Yearly 1.5. Specify 1 cleaning every _____ years) 1.6. Not required cleaning- up 1.7. Fill it with earth and make another one	_____ th.soum
2. No expenditures	
Other, please specify _____	_____ th.soum

49. Which one-off expenses have you incurred for your sanitation system?

Action	None	Cost UZ soum
1. Separate building for sewage construction	1	_____ th.soum
2. Installed pit / septic	1	_____ th.soum
3. Water storage tanks for sewage	1	_____ th.soum
4. Other, please specify _____		_____ th.soum

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

NON-MONETARY COSTS OF CURRENT WSS SERVICES

50. For what purposes are you having the most difficulties with the water? INT: SPECIFY ALL THAT RELATES, SEVERAL ANSWERS ARE POSSIBLE

No problems	1
Drinking	2
Cooking	3
Dishwashing	4
Bathing/Showering	5
Garden	6
Animal/Livestock	7
Farming, watering	8
Other, please specify _____	

51. Are you aware of any negative health impacts of your water being experienced by any members of your household??

1. Yes	2. No → *go to question № 53*

52. What are these negative effects faced? INT. SEVERAL ANSWERS ARE POSSIBLE

Gastrointestinal Disorders	1
Blood disease / anemia	2
Diseases related to iodine deficiency	3
Genitourinary - kidney stones	4
Diseases related to the musculoskeletal system (bones, joints)	5
Diseases of the respiratory system	6
Cardiovascular diseases	7
Infectious diseases (hepatitis, dysentery, etc)	8
The severity of water delivery and sewage disposal (eg, back pain)	9
Hygiene problems due to sewage system (ie not enough water)	10
Other, please specify _____	11

SERVICE ACCOUNTABILITY / RELATIONSHIP WITH UTILITIES

Of all the utility providers you deal with, please rate the level of service of each (1=excellent service, 5 = very poor service, NA = no service from utility)

53. Services of electricity supply	1 2 3 4 5 6
54. Service of gas supply (piped gas)	1 2 3 4 5 6
55. Services on water supply	1 2 3 4 5 6

56. Which of the following organizations you are applying primarily, when you have any questions / problems related to water supply and sanitation? INT: PLEASE TICK ONE

Mahalla committee	1
Hokimyat	2
Vodokanal	3
Homeowners Association	4
None	5
Other, please specify	

57. Are you satisfied with your water utility service? (INT. READ THE ANSWERS)

Yes, satisfied	1
Low level of responsibility	
Too expensive bills relative to the level of services	2
Water utility representatives never came to my house	3
Quality of service is very poor	4
Requests for payment for work for which we did not expect to pay	5
Other, please specify _____	

58. Does the water utility inform you in advance of any modification of water supply regime (water supply disconnection or change in water quality, etc.)?

1. Yes, always	2. Yes, sometimes	3. No, never

59. Has anyone in your household ever contacted your Vodokanal regarding the problem with water supply and sanitation system?

1. Yes	2. No → *go to question № 62*

60. How long did it take for respond at Vodokanal concerning with water and sanitation system problems? (INT. ONE ANSWER ONLY)

One day	1
Within a week	2
Within 1-2 weeks	3
Within 2 weeks to 1 month	4
More than a month	5

61. Did they solve the problem satisfactorily? (INT. ONE ANSWER ONLY)

1. Yes	2. No	3. Don't know / Undecided

62. In the last 6 months, how often have you referred to servicemen to have any problems with your water supply and sewage system within your household? (INT. ONE ANSWER ONLY)

Never	1
Once	2
Twice	3
Three times	4
More than three times	5
Not sure	6
Undicided	99

63. How often do you pay to Vodokanal for water supply and sewage system? (INT. ONE ANSWER ONLY)

Monthly	1
Every 2 month	2
Once in 3-4 months	3
Half yearly	4
Once a year	5

64. Do you understand the billing system of Vodokanal?

1. Yes	2. No

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

65. Do you currently have any arrears on your water utility bill to Vodokanal?

1. Yes	2. No	3. Not sure

66. Do you sometimes have to make unofficial payments to secure your supply?

1. Yes	2. No	3. Not sure

67. If you did not pay a water bill within the last 12 months, what was the main reason? (TICK ALL THAT APPLY)

No specific reason	1
Cannot afford it	2
Did not receive enough water	3
Billing methods are not accurate	4
Nobody pays in my neighborhood	5
Other (please specify) _____	
Pay regularly	6

68. Is there any penalty for non-payment of bills?

1. Yes	2. No →go to question №70	3. Not sure

69. If yes, what are the penalties?

Service is cut off	1
Penalty payment	2
Reprimanded by utility	3
Reprimanded by Mahalla committee	4
Other, please specify _____	

70. Do you think that for households with normative water pricing (no meters) it is a common practice for not all household members to be reported to the government?

1. Yes	2. No	3. Not sure

71. If water is delivered by a tanker truck, are you satisfied with this service? (INT. IF HH RECIVE WATER FROM TRUCK TANKER AT LEAST ONCE A YEAR)

1. Yes → *go to question № 73*	2. No	3. Do not get water by truck tanker → *go to question № 73*

72. Why are you not satisfied with the service delivery of water by truck tanker? INT.TICK ALL THAT APPLY, SEVERAL ANSWERS ARE POSSIBLE

The price is too high	1
The price is highly variable	2
The truck tanker does not come often	3
The quality is not good	4
Other, please specify _____	

73. Do you think that other households with access to piped water supply and sanitation system use water inefficiently?

1. Yes	2. No → *go to question № 75*	3. Not sure → *go to question № 75*

74. How irrational use of water in other households? INT: ALL THAT APPLY.

People leave taps, hoses open, it is expected that water will pour	1
People spend a lot of water when fill bins in public places	2
People spend inefficiently water for their activities	3
People use water for non-essential purposes (such as cleaning the outer surfaces, gardens, etc.)	4
Other, please specify _____	

75. How do you think, what is the best way to encourage the rational use of water? INT: ALL THAT APPLY.

A better policy of government departments	1
Encouragement through savings on accounts	2
Conduct trainings on careful use of water	3
Better service (more reliable, predictable)	4
Free technical assistance to maintain water supply and sanitation system	5
Distribution of materials on careful attitude to water	6
Advertising in the media	7
Installation of water meters	8
Other, please specify _____	

76. How often do you think people who have piped water supply and sanitation system with water meter illegally cut into the water system? INT: TICK FROM 1-5 (1 = THIS HAPPENS FREQUENTLY, 5 = IT DOES NOT HAPPEN). EXAMPLES MAY BE: CONNECTING TO THE WATER SUPPLY TO TAKE WATER ILLEGALLY, INTERFERENCE WITH METER, ETC

1	**2**	**3**	**4**	**5**

IF CHOSEN 5, THAN GO TO QUESTION №78

77. How do you think under what circumstances, people resort to illegal connections to the drinking water supply system? INT: TICK ALL THAT APPLY.

Not enough money to pay	1
Avoid payments	2
Agreement with government officials	3
Other, please specify _____	
Undecided	99

78. 80. If you think the interference is a problem, what is in your opinion the best way to solve it?

I do not think that is the problem	1
Stricter controls and penalties	2
Installing new meters that cannot be tampered with	3
Changing the billing system	4
Reduced prices for water	5
Other, please specify _____	
Undecided	99

79. Were there ever in the settlement / mahalla disputes or conflicts regarding facilities / water and sanitation infrastructure?

1. Yes	2. No → *go to question № 81*	3. Not sure → *go to question № 81*

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

80. Specify listed disputes or conflicts in the settlement / mahalla related facilities / infrastructure, water supply and sanitation? INT: ALL THAT APPLY.

Payments	1
Service	2
Problems with services	3
Poor infrastructure / facilities	4
Other, please specify _____	

WILLINGNESS TO PAY FOR IMPROVEMENTS

INT. MOVE AMOUNT OF WATER CHARGES IN THE TABLE BELOW FROM QUESTION №45

FILL IN: _____ th.soum /month

81. Now, suppose that all problems with your water supply and sanitation system would be solved: (INT. EXPLAIN THAT THIS GOOD QUALITY WATER FOR 24 HOURS A DAY IN SUFFICIENT QUANTITIES).

How much your HH is ready to pay for water every month?

FILL IN: _____ th.soum / month

Not willing to pay for improvement – 99
No problems, we are satisfied -2

82. Please select one of the most serious problems of water supply your HH? INT: READ OPTIONS ANSWERS, TICK TWO OPTIONS, READ ANSWERS

No, problems with water supply	1
Irregular water supply	2
Poor water quality	3
No water supply inside house	4
No water meter	5
The price is too high	6
Unclear system of calculating payment for water	7
Other, please specify _____	

83. Please select one of the most serious problems of the toilet in your HH. INT: READ ANSWERS OPTIONS, MARK TWO OPTIONS, READ ANSWERS

No, problems with sewage	1
No sanitation	2
No water in the toilet	3
Frequent sanitation blockages	4
Quick fullness of the pit / Septic Tank	5
Other, please specify _____	

84. Do you have additional comments or ideas for water supply and sanitation system?

FILL IN:
_____
_____

INFORMATION ON HOUSEHOLD AND DEMOGRAPHICS

85. Specify the number of household members living in the household more than 6 months, i.e

1. Males 60+;	(_____)members
2. Females 60+;	(_____) members
3. Males;	(_____) members
4. Females;	(_____) members
5. Boys >18;	(_____) members
6. Girls>18.	(_____) members
TOTAL	(_____) members

86. Number of active (working) members of the household.

1 member of the HH	1
2 members of the HH	2
3 members of the HH	3
4 members of the HH	4
5 members of the HH	5
6 members of the HH	6
7 members of the HH	7
8 members of the HH	8
9 members of the HH	9
More than 10 members of the HH	10

87. What type of basic housing?

Apartment in private apartment building	1	
Apartment in government apartment building	2	
One-storey private house with land plot	3	
One-storey private house without land plot	4	
Two/three-storey private house with land plot	5	To question № 89
Two/three storey private house without land plot	6	
Improvised domicile (mud shack)	7	
Other, please specify:_____		

88. Specify the floor, where you live? (INT. FILL IN IF HH IN MULTISTOREY HOUSE)

FILL IN:_____floor _____multistorey house

89. Property type of the basic housing

1. Own	2. Rent	Other, please specify:___

90. Age of household head |___|___|___|

91. Educational Level**?** INT: INDICATE THE HIGHEST LEVEL OF EDUCATION RECEIVED.

	Respondent 60.1	**Head of HH 60.2**
Primary education (school)	**1**	**1**
Secondary special	**2**	**2**
Higher education (diploma)	**3**	**3**
Academic degree	**4**	**4**

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

92. Employment Status

	Respondent 60.1	Head of HH 60.2
Employee / employee in a private company, PE	1	1
State employee / employee of budget organization	2	2
Worker of HH / Tamorka	3	3
No permanent jobs, seasonal work	4	4
Farmer, agricultural worker, wageworker	5	5
Unemployed	6	6
Housekeeper	7	7
Pensioner	8	8
Disabled	9	9
Learner / student	10	10

93. Which of the following do you have at home? (INT. RECORD ALL RESPONSES)

Usual TV	1
Plasma TV, LCD	2
DVD, the video player	3
Computer, laptop	4
Tablet	5
smartphone	6
Split air conditioner (winter / summer)	7
Washing machine (Soviet-style)	8
Washing machine	9
Boiler for hot water	10
Microwave oven	11
Fridge	12
Gas-stove	13
Car up to 2000 year	14
Car after the 2000 release	15

94. How do you qualify your current financial situation. INT. SHOW TABLE TO RESPONDENT, CHOOSE ONLY ONE ANSWER

We do not have enough to cover basic food necessities	1
We can pay for food necessities, but the income is not enough to purchase new clothes or pay for utilities	2
We can pay for food necessities, utilities and clothes but not enough for appliances like a new fridge	3
Enough for all of the above and to pay for some appliances like a new fridge	4
Enough for everything except a new house, new apartment or a new car	5
Enough if necessary to get a new house, new apartment or a new car	6

THANK YOU VERY MUCH FOR YOR RESPONSES!!!

HOUSEHOLD QUESTIONNAIRE
(UNCONNECTED TO NETWORK)

The project "Water supply and sanitation social impact assessment on the territory of Uzbekistan"

Conversation with a member of the HH at the age of 18+, who is aware of the state of water and sanitation services and the costs associated with them

(TO BE FILLED OUT BY THE RESEARCHER BEFORE INTERVIEW)

Number of the questionnaire |____|____|____|

The quota **City** **1**

Regional city **2**

Rural area **3**

CITY/VILLAGE	Index _____

The exact address of HH

St.	
Apartment	№
Flat	

Type of accommodation

Apartment in the apartment house (ground floor)	1	☐ to the question **G**
House or a cottage on the site ("Hawley")	2	☐ to the question **I**
Other to FILL IN		☐ to the question **I**

Connected to WS system **YES → CONTINUE INTERVIEW**

NO→ FINISH THE INTERVIEW

Date of interview: **date** |____|____| **month** |____|____|

Interviewer: **surname** _____ **sign** _____ **№** ____

Encoding: **surname** _____ **sign** _____ **№** ____

Operator: **surname** _____ **sign** _____ **№** ____

Name of respondent: _____

My name is _____ and I am working with a team of researchers on behalf of the World Bank investigating water and sanitation issues as they relate to your household. We are interviewing a number of households in your area and other areas of Uzbekistan. We are interviewing a number of households in The objective of this study is to better understand consumer experiences and needs related to water and sanitation services (from households like yours). The collected information will remain confidential. It is for the purpose of this survey only.

95. INT: ASK THE RESPONDENT ABOUT THE HOUSEHOLD'S MOST IMPORTANT WATER SOURCES.FILL OUT THE COLUMN FOR EACH SOURCE SPECIFIED BY RESPONDENT SOURCES. **Specify 3 the most important sources of water for HH.**

			1. Piping from source inside home (internal tap)	2. Piped water supply inside yard (outside tap)	3. Piped water outside yard (on the street, neighbors, in the other village)	4. Hand pump/ pump in the yard	5. Hand pump /outside yard	6. Rainwater collected	7. River, lake, pond, the other natural reservoir	8. Canal for irrigation	9. Channel for drainage	10. The tanker truck	11. Buying bottled water	Other (please specify). _____
96. Purpose/s that source is used for. FOR THE LAST YEAR	96.1.	Drinking			3	4	5	6	7	8	9	10	11	
	96.2.	Cooking / Dishwashing			3	4	5	6	7	8	9	10	11	
	96.3.	Bathing / Showering			3	4	5	6	7	8	9	10	11	
	96.4.	Laundry / Cleaning			3	4	5	6	7	8	9	10	11	
	96.5.	Garden			3	4	5	6	7	8	9	10	11	
	96.6.	Farming			3	4	5	6	7	8	9	10	11	
	96.7.	Other, please specify			3	4	5	6	7	8	9	10	11	
97. Average days per week source is available FOR THE LAST MONTH	97.1.	7 days per week			3	4	5							
	97.2.	5-7 days per week			3	4	5							
	97.3.	2-5 days per week			3	4	5							
	97.4.	<2 days per week			3	4	5							
98. Daily period/s of availability to household FOR THE LAST MONTH	98.1.	All the time			3	4	5							
	98.2.	00:00 - 01:00			3	4	5							
	98.3.	01:00 - 02:00			3	4	5							
	98.4.	02:00-03:00			3	4	5							
	98.5.	03:00 - 04:00			3	4	5							
	98.6.	04:00 - 05:00			3	4	5							
	98.7.	05:00 - 06:00			3	4	5							
	98.8.	06:00 - 07:00			3	4	5							
	98.9.	07:00 - 08:00			3	4	5							
	98.10.	08:00 - 09:00			3	4	5							
	98.11.	09:00 - 10:00			3	4	5							
	98.12.	10:00 - 11:00			3	4	5							
	98.13.	11:00 - 12:00			3	4	5							
	98.14.	12:00 - 13:00			3	4	5							
	98.15.	13:00 - 14:00			3	4	5							
	98.16.	14:00 - 15:00			3	4	5							
	98.17.	15:00 - 16:00			3	4	5							
	98.18.	16:00 - 17:00			3	4	5							
	98.19.	17:00 - 18:00			3	4	5							
	98.20.	18:00 - 19:00			3	4	5							
	98.21.	19:00 - 20:00			3	4	5							
	98.22.	20:00 - 21:00			3	4	5							
	98.23.	21:00 - 22:00			3	4	5							
	98.24.	22:00 -23:00			3	4	5							
	98.25.	23:00 -00:00			3	4	5							

			1. Piping from source inside home (internal tap)	2. Piped water supply inside yard (outside tap)	3. Piped water outside yard (on the street, neighbors, in the other village)	4. Hand pump/ pump in the yard	5. Hand pump /outside yard	6. Rainwater collected	7. River, lake, pond, the other natural reservoir	8. Canal for irrigation	9. Channel for drainage	10. The tanker truck	11. Buying bottled water	Other (please specify). _____
99. Predictability of source availability	99.1.	Unpredictable			3	4	5					10		
	99.2.	Predictable			3	4	5					10		
100. Quality of source FOR THE LAST YEAR	100.1.	No quality problems			3	4	5	6	7	8	9	10		
	100.2.	Bad taste			3	4	5	6	7	8	9	10		
	100.3.	Bad odor			3	4	5	6	7	8	9	10		
	100.4.	Bad color			3	4	5	6	7	8	9	10		
	100.5.	Salty			3	4	5	6	7	8	9	10		
	100.6.	Presence of particles, turbidity			3	4	5	6	7	8	9	10		
	100.7.	Presence of bacteria / viruses			3	4	5	6	7	8	9	10		
	100.8.	Other, please specify			3	4	5	6	7	8	9	10		
101. Treatment required. FOR THE LAST YEAR	101.1.	No treatment required			3	4	5	6	7	8	9	10		
	101.2.	Sterilizing with chemicals			3	4	5	6	7	8	9	10		
	101.3.	Filtering			3	4	5	6	7	8	9	10		
	101.4.	Boiling			3	4	5	6	7	8	9	10		
	101.5.	Sun exposure			3	4	5	6	7	8	9	10		
	101.6.	Let it stand			3	4	5	6	7	8	9	10		
	101.7.	Other, please specify			3	4	5	6	7	8	9	10		
102. Seasonal variation in source quality FOR THE LAST YEAR	102.1.	Yes			3	4	5		7	8	9	10	11	
	102.2.	No			3	4	5		7	8	9	10	11	
103. Average volume of water used daily FOR THE LAST MONTH														
104. Speed of the source flow for THE LAST YEAR	104.1.	High			3	4	5							
	104.2.	Middle			3	4	5							
	104.3.	Low			3	4	5							
105. Distance from the source	105.1.	Till 50 meters			3	4	5		7	8	9			
	105.2.	From50-500 meters			3	4	5		7	8	9			
	105.3.	From 500 till 1 km			3	4	5		7	8	9			
	105.4.	From 1 км till5 km			3	4	5		7	8	9			
	105.5.	Over 5 km			3	4	5		7	8	9			

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

106. Please specify the reasons why you are not connected to a piped water supply? INT: SEVERAL ANSWERS ARE POSSIBLE READ ALL OPTIONS

No piped sanitation network connection	1
Not have enough funds at DH for connection to piped sanitation network outside the house	2
Not have enough funds to connect to a piped sanitation network in HH	3
There are not enough funds from other HH (neighbors) to connect to the piped sanitation network outside the house	4
If all HH are connected, there will not be water pressure in the tap	5
Specify other _____	

107. How do you get water for the needs of HH? INT: SEVERAL ANSWER OPTIONS ARE POSSIBLE

Tanker truck delivers to household	1
Drive motor vehicle to source and back	2
Collect from friends household	3
Carry water by foot back from source	4
Use animal to carry water back from source	5
Other, please specify _____	

108. Which member/s of the household typically collect water? (INT. SEVERAL ANSWERS ARE POSSIBLE)

Males 60+	1
Females 60+	2
Males	3
Females	4
Boys <18	5
Girls <18	6

109. How often do you get water? INT: ONLY ONE ANSWER

4-5 times a day	1
2-3 times a day	2
1 time a day	3
3-5 times a week	4
1-2 times a week	5
1-2 times a month	6

110. How much time is spent on this task (total for all individuals), including movement to and from source and waiting time at source, at one time?

FILL IN |___|___hours |___|___|minutes (per day)

111. Are you living in the same dwelling as you were 5 years ago?

1. Yes	2. No → *go to question 21*

112. Are conditions of water supply and sanitation services in your household better now than 5 years ago? (INT. SELECT ANSWER QUESTION BELOW AND FILL IN ACCORDANCE WITH SELECTED RESPONSES)

1. Yes, they are improved		**2. No, worsened**		**3. Did not change**	**4. Not sure**
113. Specify the reasons of improving the water supply and sanitation systems in your DH?		**114. Specify the reasons of worsening water supply and sanitation conditions in your DH?**			
The quality of sources improved	1	The quality sources worsened	1		
Availability of sources of improved	2	Availability of sources worsened	2		
Access to water is now easier	3	Access to water is now harder	3		
Burden of the collection / storage now lower	4	Burden of the collection / storage now higher	4		
Services of Vodokanal now cheaper	5	Services Vodokanal now more expensive	5		
Now fewer health problems due to the Vodokanal	6	Now more health problems because of the Vodokanal	6		
Other, please specify _____		Other, please specify _____			

Who does the following in your household? INT: SPECIFY ALL THAT RELATES, READ OPTIONS

115. Cooking	**7.** Males 60+; **8.** Females 60+; **9.** Males; **10.** Females; **11.** Мальчики <18; **12.** Девочки<18.
116. Dishwashing	**1.** Мужчины 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Boys >18; **6.** Girls>18.
117. Laundry	**1.** Males 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Мальчики >18; **6.** Girls>18.
118. Cleaning	**1.** Males 60+; **2.** Females 60+; **3.** Males; **4.** Females; **5.** Boys >18; **6.** Girls>18.

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

119. In your opinion, do you think that a household connection to the public network water and sewage services is more likely to improve the quality of life for men, women or both equally? (ITN. ONLY ONE ANSWER)

1. Males	**2.** Females	**3.** Both equally	**4.** Not sure

Sanitation

120. Where is your toilet? (INT. SEVERAL ANSWERS ARE POSSIBLE)

Inside the house	1
Outside the house, but within the yard	2
Out of the house, on public area	3
Other, please specify _____	

121. What kind of toilet do you use more often?

Flush toilet / bowl connected to a piped water supply and sanitation	1
Flush toilet / bowl connected to the waste pit	2
Flush toilet / Bowl, not connected to the insulated tank with a leak into the ground	3
Shared with neighbors toilet in the yard	4
Toilet in a private yard	5
No toilet (open defecation)	6
Other, please specify	

122. If the sanitation facility is located outside the household, do women feel safe to use sanitation facilities at night time? (Int. DO NOT ASK THIS QUESTION, FOR THOSE WHO HAVE A SANITATION FACILITIES IN HH)

1. Yes, very scared	2. Yes, it is not safe	3. No, we used to

123. Is there water for any needs in the territory of your sanitation facility?

1. Yes, alwways	2. Yes, sometimes	3. No

124. Is the sanitation facility shared with other households?

1. Yes	**2. NO** → *go to question 32*

125. If yes, how many households use it?

FILL IN: |___|___|___| **HH**

126. How often do you wash your hands after going to the toilet?

Always	1
Often	2
Never	3
Don't know	4
Sometimes, not always	5

} *go the question 42*

127. If not always, why?

Not necessarily	1
Forgeting	2
No such habits	3
No facilities for hand washing	4
Not enough water	5
Other, please specify _____	

128. Specify why you are not connected to a piped sewer system? (INT. SEVERAL ANSWERS ARE POSSIBLE, READ POSSIBLE OPTIONS)

No piped connection	1
Not have sufficient funds at HH for connection to piped sanitation outside the house	2
Not have enough funds to connect to a piped sanitation inside the HH	3
There are not enough funds from other HH (neighbors) to connect to the piped sanitation outside the house	4
Other,please specify . _____	5

129. Would you like to connect to sewer pipeline system?

1. Yes	2. No

130. Where empties sanitation construction? (INT READ ANSWERS OPTIONS, TICK ONLY ONE).

Concrete septic tank	1
Earthen septic tank	2
Lined pit	3
Unlined pit	4
Drain	5
Channel	6
Irrigation ditch near the house	7
Don't know	8
Other, please specify _____	

COSTS / MATERIAL COSTS FOR HOUSEHOLD SERVICES FOR WSS SERVICES

131. Please tell how much is the cost of your HH presented below for public utilities?

	Expenses		Undecided	Cost UZ soum
3.	Electricity / month	winter	1	_____th. soum
		summer	1	_____ th. soum
4.	Gas / month (seasonal) / month	winter	1	_____ th. soum
		summer	1	_____ th. soum
3.	Drinking water (tap, bottled, from tanker truck or other source) / month	winter	1	_____ th. soum
		summer		_____ th. soum

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

132. Please tell what are TOTAL expanses of your household per month on average:

	Name		Undecided	TOTAL expenses
2.	Total expenses (Int. INDICATE ALL COSTS OF HH FOR ALL NEEDS)	winter	1	_____ th.soum
		summer	1	_____ th.soum

133. Indicate all expenses related to providing water HH in the past year? INT: FILL ONLY RELEVANT POINTS.

Action	None	Cost UZ soum
1. Expenses on pump / hand pump / month	1	_____ th.soum
2. Payment for water from tanker truck / month	1	_____ th.soum
3. Bottled water / week	1	_____ th.soum
4. Buying water from friends' households / week	1	_____ th.soum
5. Water treatment (processing, filtering, etc.) / year	1	_____ th.soum
6. Payment for attending public bath / month	1	_____ th.soum
7. Fuel for transport for bringing water / month	1	_____ th.soum
8. Other, please specify _____	1	_____ th.soum

134. Which one-off expenses you had on your water supply system?

Action	None	Cost UZ soum
1. Constructing groundwater well	1	_____ th.soum
2. Livestock for transporting water	1	_____ th.soum
3. Piping from the source to the household	1	_____ th.soum
4. Below-ground tanks for storage of water	1	_____ th.soum
5. Tanks for the transport of water	1	_____ th.soum
6. Water storage tanks	1	_____ th.soum
7. Other, please specify _____		_____ th.soum

135. Specify any expenses related to sanitation system? INT: SPECIFY ALL THAT RELATES

Action	Cost UZ soum
1. Cleaning out of pit / concrete pits (by contractor or household) 1.1. Once in year 1.2. 3-Monthly 1.3. 6-Monthly 1.4. Yearly 1.5. Specify 1 cleaning every _____ years) 1.6. Not required cleaning- up 1.7. Fill it with earth and make another one	_____ th.soum
2. No expenditures	
Other, please specify _____	_____ th.soum

136. Which one-off expenses have you incurred for your sanitation system?

Action	None	Cost UZ soum
1. Separate building for sewage construction	1	_____th.soum
2. Installed pit / septic	1	_____th.soum
3. Water storage tanks for sewage	1	_____th.soum
4. Other, please specify _____		_____th.soum

NON-MONETARY COSTS OF CURRENT WSS SERVICES

137. For what purposes are you having the most difficulties with the water? INT: SPECIFY ALL THAT RELATES, SEVERAL ANSWERS ARE POSSIBLE

No problems	1
Drinking	2
Cooking	3
Dishwashing	4
Bathing/Showering	5
Garden	6
Animal/Livestock	7
Farming, watering	8
Other, please specify _____	

138. Are you aware of any negative health impacts of your water being experienced by any members of your household?

1. Yes	2. No → *go to question № 46*

139. What are these negative effects faced? INT. SEVERAL ANSWERS ARE POSSIBLE

Gastrointestinal Disorders	1
Blood disease / anemia	2
Diseases related to iodine deficiency	3
Genitourinary - kidney stones	4
Diseases related to the musculoskeletal system (bones, joints)	5
Diseases of the respiratory system	6
Cardiovascular diseases	7
Infectious diseases (hepatitis, dysentery, etc)	8
The severity of water delivery and sewage disposal (eg, back pain)	9
Hygiene problems due to sewage system (ie not enough water)	10
Other, please specify _____	11

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

SERVICE ACCOUNTABILITY / RELATIONSHIP WITH UTILITIES

Of all the utility providers you deal with, please rate the level of service of each (1=excellent service, 5 = very poor service, NA = no service from utility)

140.	Services of electricity supply	1	2	3	4	5	6
141.	Service of gas supply (piped gas)	1	2	3	4	5	6
142.	Services on water supply	1	2	3	4	5	6

143. If water is delivered by a tank water truck/ carriers, are you satisfied with this service?
(Ask if household receives water from water trucks/ carriers at least once a year

1. Yes → *go to question № 51*	2. No	3. Do not get water from a water truck/ carrier *go to question № 51*

144. Why are you not satisfied with the service delivery of the water truck/ carrier? (Interviewer: more than one answer is possible)

The price is too high	1
The price fluctuates too much	2
Water trucks do not come here very often	3
The quality of the water is not good	4
Other, please specify _____	

WILLINGNESS TO PAY FOR IMPROVEMENTS

145. How much would you be willing to pay for connection to the water supply? NOW, SUPPOSE THAT IT WOULD BE POSSIBLE TO SUPPLY GOOD QUALITY PIPED WATER 24 HOURS PER DAY IN SUFFICIENT AMOUNTS TO MEET ALL YOUR DRINKING, SERVICE AND SANITATION NEEDS, SO THAT YOU WOULD NOT HAVE TO USE ANY OTHER WATER SOURCES. WOULD YOU BE WILLING TO PAY THE FOLLOWING AMOUNT IN TOTAL?

FILL IN: _____ th. soum / month

1. You are willing pay lump or in installments?
   1.1. Lump
   1.2. In istallments
2. Not willing to pay for improvement – 1
3. Undecided

146. How much are you willing to pay per month for water?

FILL IN: _____ тыс. сум / месяц

Not willing to pay for improvement – 99
Willing to pay according the meter - 2

147. Do you have additional comments or ideas for water supply and sanitation system?

FILL IN:
_____
_____

INFORMATION ON HOUSEHOLD AND DEMOGRAPHICS

148. Specify the number of household members living in the household more than 6 months, i.e

7. Males 60+;	(_____) members
8. Females 60+;	(_____) members
9. Males;	(_____) members
10. Females;	(_____) members
11. Boys <18;	(_____) members
12. Girls<18.	(_____) members
ВСЕГО	(_____) members

149. Number of active (working) members of the household. INT. EXPLAIN THAT THEY ARE ALL MEMBERS OF HH WHO WORK, WHETHER THEY GET SALARY OR NOT, FOR EXAMPLE, WORK ON THE LOCAL AREA (TOMORKA)

1 member of HH	1
2 members of HH	2
3 members of HH	3
4 members of HH	4
5 members of HH	5
6 members of HH	6
7 members of HH	7
8 members of HH	8
9 members of HH	9
Более 10 members of HH	10

150. What type of basic housing?

Apartment in private apartment building	1	
Apartment in government apartment building	2	
One-storey private house with land plot	3	
One-storey private house without land plot	4	
Two/three-storey private house with land plot	5	To question № 58
Two/three storey private house without land plot	6	
Improvised domicile (mud shack)	7	
Other, please specify:_____		

151. Укажите этаж, на котором Вы проживаете? (ИНТ. ЗАПОЛНИТЕ, ЕСЛИ ДХ В МНОГОЭТАЖНОМ ДОМЕ)

FILL IN:_____этаж в _____этажном доме

152. Property type of the basic housing

1. Own	2. Rent	Other, please specify:____

153. Age of household head |___|___|___| years old

154. Educational Level**?** INT: INDICATE THE HIGHEST LEVEL OF EDUCATION RECEIVED

	Respondent 60.1	**Head of HH 60.2**
Primary education (school)	**1**	**1**
Secondary special	**2**	**2**
Higher education (diploma)	**3**	**3**
Academic degree	**4**	**4**

ANNEX C. QUESTIONNAIRE FOR QUANTITATIVE SURVEY

155. Employment Status

	Respondent 60.1	Head of HH 60.2
Employee / employee in a private company, PE	1	1
State employee / employee of budget organization	2	2
Worker of HH / Tamorka	3	3
No permanent jobs, seasonal work	4	4
Farmer, agricultural worker, wageworker	5	5
Unemployed	6	6
Housekeeper	7	7
Pensioner	8	8
Disabled	9	9
Learner / student	10	10

156. Which of the following do you have at home? (INT. RECORD ALL RESPONSES)

Usual TV	1
Plasma TV, LCD	2
DVD, the video player	3
Computer, laptop	4
Tablet	5
smartphone	6
Split air conditioner (winter / summer)	7
Washing machine (Soviet-style)	8
Washing machine	9
Boiler for hot water	10
Microwave oven	11
Fridge	12
Gas-stove	13
Car up to 2000 year	14
Car after the 2000 release	15

157. How do you assess your material situation of your HH. INT. SHOW TABLE TO RESPONDENT, CHOOSE ONLY ONE ANSWER

We do not have enough to cover basic food necessities	1
We can pay for food necessities, but the income is not enough to purchase new clothes or pay for utilities	2
We can pay for food necessities, utilities and clothes but not enough for appliances like a new fridge	3
Enough for all of the above and to pay for some appliances like a new fridge	4
Enough for everything except a new house, new apartment or a new car	5
Enough if necessary to get a new house, new apartment or a new car	6

THANK YOU VERY MUCH FOR YOUR RESPONSES!!!

ANNEX D. FOCUS GROUP DISCUSSION GUIDES

Social Impact Analysis of Drinking Water and Sanitation in Uzbekistan

Focus Group Discussion Guide and Write Up Template - For Households Without Networked Connection

The following guide is included to help the research firm carry out focus group discussions (FGDs) with consumers WITHOUT piped (utility supplied) water connection. Each FGD shall comprise the following elements:

- *Introduction*
- *Consumption Patters: designed to capture perception of water and sanitation (**WSS) availability / quality, water needs and usage, and coping strategies**.*
- *Costs and Coping Strategies : designed to capture **expenditure/costs incurred for WSS services** and **non-monetary impacts of poor service** on health, earnings opportunities, livelihood among others.*
- *Improvements and Willingness to Pay: designed to capture **willingness of households to pay** for WSS access and quality improvements, tariff price increases, behavioral change and demand management options, improvements households would like to see and conditions under which households would accept price increases. This exercise also explores **what kind of interaction occurs between consumers and suppliers in WSS provision / management** and the responsive of public bodies; and*
- *Wrap-up.*

INTRODUCTION (approx 15 mins)

Introduce the purpose of the research. Explain that the purpose of the FGD is to explore how consumers obtain their water supply and sanitation (WSS) services and how their experience has been, what activities they use water for, what type of improvements they would like to see in their water supply and sanitation, and their impressions of and interactions with any public bodies in their attempt to gain access or better quality WSS provision. Ask for permission to record the discussion. Explain that people's anonymity will be respected and participants will not be cited based on any personal identifiers.

Fill Table 1 and 2 at the beginning of the meeting and proceed to the exercises. Table 1 can be filled in by the interviewer. For Table 2, ask each participant to briefly introduce themselves with some basic information (see Table 2).These questions are for introductory purposes only. If the discussion becomes heated over one particular point, explain that these will be covered in more detail during the discussion to follow, and proceed to the first exercise. If participant feels uncomfortable answering anything in the group, move on to the next point (you may try to catch them during breaks or at end of meeting). Note any issues that are brought up and may not be specifically covered in the research. Prompt respondents to discuss/elaborate more in the relevant section of the discussion.

Table 1: Composition of Group

Type of settlement	*e.g. Rural/District City/Oblast City*
Region, District Name	
No of participants	
Gender Composition	*e.g. 100% female, 40% male..*

ANNEX D. FOCUS GROUP DISCUSSION GUIDES

Table 2: FGD participant details

Participant[1]	*Gender and Age*	*Employment Status*	*Number of Household Members*	*Main Source of Household Income*	*Brief description of dwelling (House/apt)*	*Type of Sanitation system*
	e.g. Male, 32			*e.g. remittances/ manual labor/ farm income*		*e.g. Shared Toilet*
						e.g. Flush Toilet

Any Comments on Participant Composition:

EXERCISE 1: CONSUMPTION/USAGE PATTERNS (Water Source, Availability, Supply, Usage *[approximately 35 min]*

The goal of this exercise is to understand where consumers get their water from, what type of sanitation facility they have, what they use water for, how much they demand and when demand peaks,.what the water quality is like. Gender dynamics should be carefully studied as women's needs and perceptions might differ from men's. ***Building upon the participants details on Table 2, start the discussion covering the following topics[37].***

Interactive Exercise: Water Sources and Usage

Ask participants what water sources they use and for what purposes. List these on a flip chart as shown in Figure 1.

Figure 1: Water Sources and Usage

	Source	*Use*	*Source*	*Use*		
Participant 1	*Handpump*	*Washing/ Bathing*	*Truck Delivery*	*Drinking*		

Building on this exercise, discuss the following issues:

Water Source/Availability

- *How long does it take for them to collect the water? How often to they buy water?*
- *Has it been stressful at times to obtain water?*
- *Would they like to have networked water? Have they tried to get it? What happened?*

Water Storage, Quality, System

- *How do you store your water? (capture all different systems used).*
- *Do you leave the public standpipe tap open before the availability period if irregular hours?*
- *What is the quality of water like? Have you experienced getting bad quality water? Regularly, not at all? What was wrong with it? Do you know why?*
- *How often do they come across problems of repair/maintenance and what are the problems? How do they solve it or why are they unable to solve it? i.e. can they ask any organization/local government agency/Makhalla for help?*
- *Do they know where the waste water goes from bathing/washing?*

37 *The questions in each category do not have to be asked in the same order.*

Sanitation

- *What sort of sanitation facility do they have?*
- *If off site, how long do they need to travel to access it?*
- *If offsite, what are the factors that is making it difficult for them to have an onsite facility? (i.e high costs of building toilet, irregular water supply, no sewerage connection etc).*
- *Ask them to describe any other problems they have with accessing and quality of sanitation facility. (i.e. If offsite, is water available there?).*

Write-up: This exercise will be first summarized by a table to capture sources of water for households and its usages as shown in Figure 1. The different storage options people use should then be listed in another similar table (see table 3), with their importance on a scale from 0 to 3. The write-up should then describe information on i) Source - if and why availability varies ii) water quality received and treatment strategies iii) water usage - including gender differences in water and sanitation demand and usage iv) sanitation facilities and the costs and/or benefits, and v) any accounts/stories of households trying to get connected to piped water/have onsite sanitation. The write up will provide contextual descriptions and quotes regarding these.

Table 3: Sources of Water and Storage Options for Non Networked Households

Storage Options	*Frequency[2]*	*Significance[3]*	*Comments*
e.g. Ground Tank	*8*	*3*	
e.g. e.g. X litre Container	*5*	*2*	
Storage Options	*Frequency*	*Significance*	*Comments*
e.g.			

Main Summary of Discussion and Quotes:

EXERCISE 2: Monetary WSS costs and Affordability[38], Non Monetary WSS costs and Coping Strategies

[approximately 35 min]

The goal of this exercise is to gauge how expensive WSS is for household without piped water, compared to those with piped but also compared to how much they spend on other utilities and other household spending. This includes costs of buying equipment, installation and repairs as well as non-monetary costs associated to their coping strategies, health, livelihood, and other impacts. Participants should be asked to elaborate on the costs they incur in accessing WSS services. Answers should be elicited for similar units – per month, per year (to ensure comparability in the final analysis). Questions should first be asked regarding relative monetary costs of water and sanitation compared to other utility costs or other household expenditure. This should cover a) costs of initial installation of the water source (i.e. assets purchased) iii) recurring costs of accessing and treating water and sanitaion; and iv) costs of maintenance and repair (of buying new containers, new electric pump, new handpump spare parts, etc). v) how people cope with WSS expenditures, in particular seasonal spikes and price increases. Questions should then be asked about the ***non-monetary costs*** *of using water and sanitation.*

Interactive Exercise: Monetary Costs of Current WSS System

Ask participants to think about the various purchases related to accessing and using water supply and sanitation (including buying water itself). Start with water supply i.e. any purchases required to install water source in or outside dwelling, to store the water, to treat the water, or any other related purchases. Then continue to ask about expenses incurred to access and use sanitation facilities. i.e. construction, maintenance etc. Then going around in a circle, ask participants what these items are (if participant buys water, write "buying water" as one item), ***list it on a flip chart in front of them****, as shown in Figure 2.*

38 *Questions about finances and payment may prove to be especially sensitive and need to be approached carefully.*

Figure 2: Monetary Costs Related to WSS access/use

Buy water
Electric Pump
Container
Handpump and parts

- *Then continue the discussion by asking them whether any of these purchases have been expensive or problematic to obtain and why? Which items are more significant to their needs? Summarize the results of this in Table 4 (below).*
- *How much do you spend on water compared to other utilities? i.e. compared to gas? electricity?*

Non Monetary Costs

- *The moderator should move the discussion to non monetary costs of the current system of water supply and sanitation. How much time a day would they save if they did not have to collect water? treat water?*
- *Does not having piped water in any way impact their time, earnings, or opportunity to work, or engage in other activities? How?*
- *Are people facing any health problems due to the quality of water? Have they gotten ill because of the water consumed?*
- *Are they facing any physical/health problems because of the sanitation system?*
- *How much do you think they have spent in the last year treating illnesses and ailments related to lack of water access/physical strains, or consuming bad quality water?*
- *The moderator should now move the discussion to how they are coping with the monetary and non monetary costs of their WSS systems (if they mentioned any i.e. of expenses, lack of supply of water or difficult to use sanitation facilities, water quality problems, difficulty repairing/ maintaining the infrastructure they have etc).*

Write-Up: The findings from this exercise will be summarized (similar to Exercise 1) - using description of relative costs of water and sanitation and quotes that illustrate the various points made. Based on results from the interactive exercise and subsequent question, list the monetary costs incurred to access and use WSS, the number of people this applied to, and its importance to them. Then summarize the discussion on i) monetary costs mentioned, whether and why certain purchases were difficult/problematic ii) non monetary – health, time, earnings, opportunity costs mentioned iii) how people cope with these.

Table 4 - Measures adopted to cope with WSS expenditures

Costs of input infrastructure needed to obtain water/ sanitation facility	*Frequency*[4]	*Significance*[5]	*Comments*
e.g. Electric pump	*3*	*5*	
e.g. Water Boiler	*5*	*4*	
e.g Filter			

Non Monetary Costs	*Frequency*	*Significance*	*Comments*
e.g. Illness	*8*		
e.g. Time away from school	*5*		
e.g. Less time at work	*2*		
etc.	*Etc*		

Summary of Discussion and Quotes:

Additional Comments:

EXERCISE 3. Willingness to pay and improvements sought *[approximately 25 min]*

The goal of this exericse is to assess what i) sort of changes and improvements consumers would like to see in their water supply and sanitation system (access and use) and/or what factors they think are working well for them in the current system ii) if they would be willing to start paying for piped connections - why or why not? ii) which improvements matter most to them and why? iii) willingness to pay for particular improvements and why?

Interactive Exercise: Benefits and Improvements Sought of Current WSS System

Provide participants with a card/pen and ask them to write down 1) if they find anything beneficial about the current system of water supply in their households? And current method of sanitation? (e.g. this could be probed by asking whether they are happy for example that they are not paying for water? What aspects of the current system are working for them?).

Then ask participants to write down 2) what they perceive to be the ***two or three*** *most problematic issues of the current system of water supply and sanitation.*

Then start the discussion by asking participants to say out loud what benefits they indicated (if any) and write them down on a flip chart.

Then ask participants what problems they indicated and write these down on the flip chart. The main focus of this section should be on these challenges and the improvements they would like to see.

- *Lead the discussion to what improvements they would like to see (given these problems). If people only mention wanting to get piped connection, probe about hours of availability, water quality issues etc under current system. Ask participants to rank the mentioned improvements (verbally). In the write up, provide these answers in Table 5, with importance of each measure indicated on a scale from 0-3..*
- *If no improvements are mentioned, then probe using the examples such as: less time to collect water, better quality, increased hours of water supply, on site sanitation, toilets with better infrastructure?*

The moderator should now move on to asking if households would be willing to pay to obtain such improvements. Reiterate the improvements that were discussed or mention the examples below:

- *If you had piped connection – would you be willing to pay for water? Why/why not?*
- *If you got very good quality water (no treatment needed) would be willing to pay for water? How much?*
- *Would you be willing to invest on an an onsite sanitation facility? Why/why not?*

The above discussion should generate very specific issues and suggestions for improvement. The moderator should help the group constructively discuss the issues mentioned and explore in detail each of the issues. The moderator or assistant should note whether all participants agree with a certain issue or whether different respondents feel strongly about a different type of issue with WSS providers / managers.

- *Moderator should now move discussion onto consumer experiences with trying to obtain water (networked or through other means) and their interactions with relevant public bodies i.e. utilities, Mahallas, Khokimiyat representatives, donors etc. do they come into contact with any of these bodies for water/sanitation related issues? Ask them to describe reasons and their perceptions on the attitude of officials.*
- *What are the avenues /places to go if they are having problems with water and/or sanitation? Ask participants to give details on what their experience has been with pursuing their issues, seeking more information/ clarification.*
- *If they felt officials were not as responsive, what do they think is the main issue why (e.g. lack of capacity, lack of interest, etc.).*

Write-Up: The write-up should list mentioned improvements and their importance to consumers in ***Table 4****; and types of difficulties consumers have with public bodies in* ***Table 5****. The rest of the discussion and answers should then be summarized in a description format similar to the above exercises – with appropriate quotes.*

Table 5 – Improvements that Consumers would like to see in WSS Services

Improvement	*# respondents mentioning*	*Rank or score (starting with highest ranked/scored)*	*Willingness to Pay*
e.g. more information on …	*8*		*50% more than current tarriff*
e.g. better metering system	*5*		*20% more*
e.g. suggested mechanism for inforamtion delivery	*etc.*		*Not mentioned*

Table 6 – Challenges with trying to obtain piped water

Issues/ Challenges with public bodies	*Frequency*	*Comments (examples of improvements/ measures that have made a difference)*
e.g. no possibility to get information on services	*8*	
e.g. refusal to connect to network	*5*	

Summary of Answers and Quotes:

Additional Comments:

***Wrap – Up** [5 min]*

Thank FGD respondents for allocating [1.5-2 hours] of their time to answer the questions. Emphasize that their answers are very important and valuable and will be used to inform water supply strategies and options carried out by the Government of Uzbekistan. Re-emphasize that their anonymity will be respected.

General Provisions

A minimum of two people should facilitate the FGDs: 1) a main moderator, with extensive experience of conducting FGDs, and 2) a note-taker/ second facilitator. All FGDs should be recorded, to allow anyone to go back and check responses if insufficient information is provided in the write-ups and tables. All notes and flip charts used during the FGDs should be kept. Since the qualitative assessment aims to understand impact on and attitudes to WSS service delivery changes among different groups of consumers, it is very important to retain stories and experiences shared by respondents. The narrative write-ups should include vivid quotes that illustrate different points of view. All quotes should include proper references (locale, type of FGs, gender, age and occupation of the respondent). Responses that required prompting by the facilitator should be noted. The facilitator should keep the discussions of any given issue "on track" and remind respondents that the FGD may not cover all of the raised issues. However, concerns should be noted and if possible, ranked based on their relevance and extent of importance to the respondents. The moderator should note any age or gender variations in answers, pose follow-up questions to explore these variations and record the noted differences carefully for the final report.

Social Impact Analysis of Drinking Water and Sanitation in Uzbekistan

Focus Group Discussions Guide and Write Up Template For Households With Networked Connection

The following guide is intended to help the research firm carry out focus group discussions (FGDs). All members of this focus group should received piped water supply by the utilities. Each FGD shall comprise the following elements:

- *Introduction*
- *Consumption Patterns: designed to capture water and sanitation (**WSS) availability / quality, water needs and usage, and nature and quality of services provided by utilities.***

- *Costs and Coping Strategies: designed to capture **expenditure/costs incurred for WSS services**, **non-monetary impacts of poor service** on health, earnings opportunities, livelihood among others, and coping strategies.*
- *Improvements and Willingness to Pay: designed to capture **willingness of households to pay** for WSS service improvements, tariff price increases, behavioral change and demand management options, improvements households would like to see and conditions under which households would accept tarriff increases. This exercise also explores households' expectations of utility services; and*
- *Wrap-up.*

INTRODUCTION (approx 15 mins)

*Introduce the purpose of the research. Explain that the purpose of the FGD is to explore **1) how consumers obtain their water supply and sanitation (WSS) services and how their experience has been; 2) what activities they use water for; 3) how they have benefitted because of water and sanitation access or whether they are facing any problems due to water and sanitation access/use; 4) whether they would like to see improvements in their water supply and sanitation services, including those related to service quality by the utilities.***

Ask for permission to record the discussion. Explain that people's anonymity will be respected and participants will not be cited based on any personal identifiers.

Fill Table 1 and 2 at the beginning of the meeting and proceed to the exercises. Table 1 can be filled in by the interviewer. For Table 2, ask each participant to briefly introduce themselves with some basic information (see Table 2).These questions are for introductory purposes only. If the discussion becomes heated over one particular point, explain that these will be covered in more detail during the discussion to follow, and proceed to the first exercise. If participant feels uncomfortable answering any question infront of the group, move on to the next point (you may try to catch them during breaks or at end of meeting). Note any issues that are brought up and may not be specifically covered in the research. Prompt respondents to discuss/elaborate more in the relevant section of the discussion.

Table 1: Composition of Group

Type of settlement	*e.g. Rural/District City/Oblast City*
Region, District Name	
No of participants	
Gender Composition	*e.g. 100% female, 40% male..*

Table 2: FGD participant details

Participant[6]	*Gender and Age*	*Employment Status*	*Number of Household Members*	*Main Source of Household Income*	*Brief description of dwelling (House/apt)*	*Type of Sanitation system*
	e.g. Male, 32			*e.g. remittances/ manual labor/ farm income*		*e.g. Flush toilet*
						e.g. Shared toilet

Comments on Participant Composition: e.g. Main source of income of participants changes due to seasonal employment.

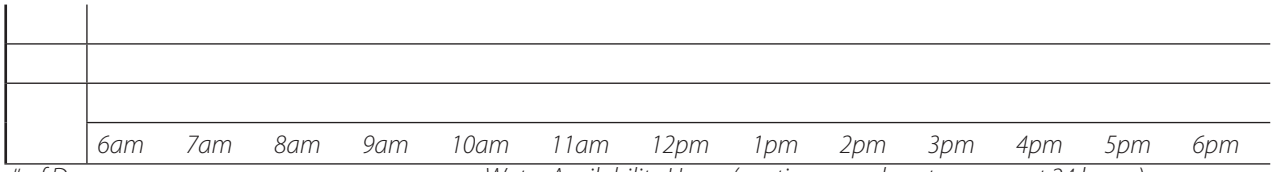
ANNEX D. FOCUS GROUP DISCUSSION GUIDES

EXERCISE 1: CONSUMPTION/USAGE PATTERNS (Water Source, Availability, Supply, Usage *[approximately 35 min]*

The goal of this exercise is to understand where consumers get their water from, what type of sanitation facility they have, what they use water for, how much they demand and when demand peaks, their experience with water and sanitation services i.e. whether water is sufficient with adequate pressure, billing methods, quality of water etc. Gender dynamics should be carefully studied as women's needs and perceptions might differ from men's. ***Building upon the participants details in Table 2, start the discussion with the interactive exercise on water availability and needs (described below) and continue covering topics and questions provided subsequently.***

The moderator should create two diagrams on a flip chart, beforehand, that look like Figure 1.

Figure 1:



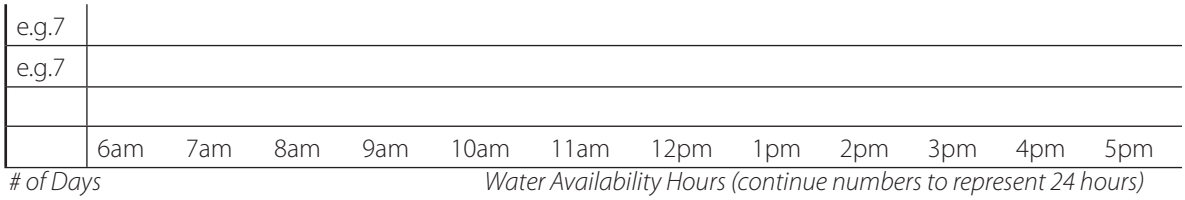
Interactive Exercise: Water Availability and Needs[39]

Ask participants a) How many days a week do you receive water in your tap? B) How many hours per day do you receive water in your tap? Ask the participants to come to the flip chart and indicate the number of days in the first column, and the number of hours by drawing a line between the hours as shown in Figure 2.

Then on the second diagram, ask participants to indicate, the hours of water supply they would ideally need per day to fulfill their water needs, as shown in Figure 3. Using the results, calculate average water availability (days and hours/day) and provide this information in the write up summary.

Figure 2: Water Availability

Figure 3: Water Needs



39 *For those participants who receive 24 hours of supply, focus on the second and subsequent questions on needs and usage of water.*

Building on these results, start a discussion around:

- *Why participants need their indicated amount of water? What are the different usages for them?*
- *If current supply is inadequate, do they use other sources than the tap?*
- *What is the water pressure like from the tap – strong, weak, sufficient?*

Water Storage, Water Quality, Service system and quality

- *How do you store your water? (capture all different systems used).*
- *Do you leave your tap on before the availability period if irregular hours?*
- *Are there times (monthly, seasonally) when getting water is more difficult than usual? Why?*
- *What is the quality of water normally like? Have you experienced getting bad quality water? Regularly, not at all? What was wrong with it? Do you know why?*
- *How often do you come across problems of leakage or any other problems? (If yes, ask them to describe how they dealt with the problems).*
- *Are the utilities responsive to your needs and issues?*
- *Do you have an installed meter? Ask them to describe what benefits they see of having a meter (or not)?*
- *Do you clearly understand your bills and the overall billing system?*
- *Do you know where the waste water goes from bathing/washing?*

Sanitation

- *What sort of sanitation facility do you have?*
- *If offsite: how long do you need to travel to access it?*
- *If offsite - what are the factors that is making it difficult for you to have an onsite facility? (i.e high costs of building toilet, irregular water supply, no sewerage connection etc).*

Describe any other problems you have with accessing and quality of sanitation facility.
Write-up: This exercise will be summarized by one table to capture water usage and the different storage options people use (See Table 3), with their importance on a scale from 1 to 5. The write-up will then describe information on i) supply - if and why availability varies and other sources that piped consumers depend on ii) gender differences in water needs and usage iii) system of service provision by utilities (billing methods etc) and any issues or problems discussed in terms of operation and maintenance iv) sanitation facilities. The write up will provide a detailed summary of discussion and quotes regarding these.

Table 3: Other Sources of Water and Storage Options

Water Usage	*Frequency*[7]	*Significance*[8]	*Comments*
Domestic Use (Cooking, bathing)	*8*	*3*	
Gardening	*5*	*2*	
Cattle			
Storage Options	*Frequency*	*Significance*	*Comments*
e.g. No need for storage			
e.g. X litre Container			

Summary of Discussion and Quotes:

Additional Comments:

EXERCISE 2: Monetary WSS costs and Affordability[40], Non Monetary WSS costs, and Coping Strategies

[approximately 35 min]

The goal of these exercises are to estimate the costs that WSS households incur to obtain and use water and sanitation facilities. Questions should first be asked regarding ***monetary costs***[41] *such as i) tarriffs, costs of installation, maintenance and repair of pipes and related infrastructure, costs of treating the water and ii)* ***non monetary costs*** *such as health, time costs, costs to livelihood opportunities, productive work, or other opportunity costs. This exercise also explores affordability or how people cope with WSS expenditures, in particular seasonal spikes and price increases, as well as how people cope with the non monetary costs of accesing and using WSS.*

Interactive Exercise: Monetary Costs of Current WSS System

Ask participants to think about the various purchases related to their water supply and sanitation system. Start with water supply i.e. any purchases required to get connected to piped supply, to store the water, to treat the water, or any other related purchases. Then continue to ask about expenses incurred to access and use sanitation facilities. i.e. construction, maintenance etc. Then going around in a circle, ask participants what these items have been and list it on a flip chart in front of them - first related to water and then to sanitation.

- *Then continue the discussion by asking them whether any of these purchases have been expensive or problematic to obtain and why? i.e. are certain repair items not accessible in the market? Are they too expensive? Which items are more significant to their needs? Summarize the results of this in Table 4 (below).*
- *How much do they spend on water fees compared to other utilities? i.e. compared to gas? electricity?*
- *What happens if they are unable to pay their bills?*

Non Monetary Costs

- *The moderator should move the discussion to non monetary costs of the current system of water supply and sanitation. How much time a day would they save if they did not have to treat water? i.e. If no issues come up, probe by providing examples such as do they have to still use other sources of water i.e. buy water from trucks/bottle water and does this in any way impact their time, earnings, or opportunity to work, or engage in other activities?*
- *Are people facing any health problems due to the quality of water? Have they gotten ill because of the water consumed?*
- *Are they facing any physical/health problems because of the sanitation system?*
- *How much do you think they have spent in the last year treating illnesses and ailments related to lack of water access/physical strains, or consuming bad quality water?*
- *The moderator should now move the discussion to how they are coping with the monetary and non monetary costs of their WSS systems (if they mentioned any i.e. of expenses, lack of supply of water or difficult to use sanitation facilities, water quality problems, difficulty with dealing with utility providers, difficulty repairing/ maintaining the pipes etc).*

<u>Write-Up:</u> The findings from this exercise will be summarized (similar to Exercise 1) - using description of relative costs of water and sanitation and quotes that illustrate the various points made. Based on results from the interactive exercise and subsequent question, list the monetary costs incurred to access and use WSS, the number of people this applied to, and its importance to them. Then summarize the discussion on i) monetary costs mentioned, whether and why certain purchases were difficult/problematic ii) non monetary – health, time, earnings, opportunity costs mentioned iii) how people cope with these.

40 *Questions about finances and payment may prove to be especially sensitive and need to be approached carefully.*
41 *Where applicable, answers should be elicited for similar units – per month, per year - to ensure comparability in the final analysis.*

Table 4: Monetary and Non Monetary Costs to Consumers

Monetory Costs	*Frequency*	*Significance*	*Comments*
e.g. Filters	*8*	*3*	
e.g. Connection charge	*5*	*2*	
Non Monetory Costs	*Frequency*	*Significance*	*Comments*
e.g. Illness (specify)	*8*	*3*	
e.g. Time away from paid work	*5*	*2*	

Summary of Answers and Quotes:

Additional Comments:

EXERCISE 3. Willingness to pay and improvements sought in water and sanitation delivery *[approximately 25 min]*

The goal of this exericse is to assess what i) sort of changes and improvements consumers would like to see in their water supply and sanitation system (access and use) and/or what factors they think are working well for them in the current system ii) if they would be willing to increase payment for the system as it is now – why or why not? iii) how much they are willing to pay for particular improvements/ which improvements matter most to them and why?

Interactive Exercise: Benefits and Improvements Sought of Current WSS System

Provide participants with a card/pen and ask them to write down 1) if they find anything beneficial about the current system of water supply in their households? And current method of sanitation? (e.g. this could be probed by asking whether they are experiencing any benefits due to the fact that they have piped water supply).

Then ask participants to write down 2) what they perceive to be the ***two or three*** *most problematic issues of the current system of water supply and sanitation.*

Then start the discussion by asking participants to say out loud what benefits they indicated and write it down on a flip chart. Then ask participants if they would be willing to increase their payments for the current system of WSS – why or why not?

Then ask participants what problems they indicated and write this down on the flip chart. The main focus of this section should be on these issues and the improvements they would like to see.

- *Lead the discussion to what improvements they would like to see (given these problems). Ask participants to rank the improvements (verbally). In the write up, provide these answers in Table 5, with importance of each measure indicated on a scale from 0-3..*
- *If no improvements are mentioned, then probe using the examples such as: better water pressure, better quality, increased hours of water supply, on site sanitation, toilets with better infrastructure?*
- *The moderator should then move the discussion to whether participants would be willing to increase tarriffs/payments to obtain these improvements. Provide specific conditions:*

o *If you had water 24 hours a day – would you be willing to pay 50% more than your current tarriff? 30% more? Why/why not?*

o *If you had adequate water pressure throughout the day, would you be willing to pay more? 40% more? 30% more?*

o *If you got very good quality water (no treatment needed) would be willing to pay more? How much more?*

o *Would you be willing to invest on an onsite sanitation facility? Why/why not?*

ANNEX D. FOCUS GROUP DISCUSSION GUIDES

- *The above discussion should generate very specific issues and suggestions for improvement. The moderator should help the group constructively discuss the issues mentioned and explore in detail each of the issues. The moderator or assistant should note whether all participants agree with a certain issue or whether different respondents feel strongly about a different type of issue with WSS providers / managers.*
- *Continue discussion asking:*
- *What do you think is the fairest way of dividing up payments for water supply? Flat rate for everyone or higher rates for those who use more water? What about lower payments for poorer households?*
- *Do you think there is inefficient water use by other households? How do you think greater water efficiency could be encouraged? i.e. better oversight from utilities, savings incentives on bills, more reliable service, information on benefits of saving water?*
- *What are some of the key concerns and suggestions participants have in terms of their interaction with WSS service providers/utilities (pose the question openly; if necessary prompt for issues having to do with reliability of services and quality of services in general, fairness, transparency, handling of customer inquiries or complaints, etc.)?*
- *How common do you think it is to have some forms of agreement with the* bill collector privately? What kind of agreements could these be? i.e. if bill not paid? *lower payments in exchange for a gift*?
- *What are the grievance redress or complaint handling mechanisms if any? Ask participants to give details on what their experience is with pursuing claims or complaints, seeking more information/ clarification on their bill/ quality of service/ other. Were claims resolved or not. If not, what do they think is the main reason why (e.g. lack of capacity, lack of interest, etc.).*

Write-Up: The write-up should list the mentioned improvements and their importance to consumers in ***Table 5; a****nd whether or not households were willing to pay more, including an indication of how much more (if provided). The rest of the discussion and answers should then be summarized in a description format similar to the above exercises – with appropriate quotes. This should cover i) why consumers are (are not) willing to increase payment for current WSS services ii) why they are willing to pay for particular improvements over others (if this is the case). iii) any difficulties consumers have with utilities and their importance.*

Table 5 – Salient Problems with Current WSS Provision

Problems	***Frequency***	***Comments (examples of improvements/ measures that have made a difference)***
e.g. no possibility to get information on services	*8*	
e.g. non-transparency on tariff setting	*5*	

Table 6 –Improvements Consumers Would Like to See and Willingness to Pay

Improvement	*# respondents mentioning*	*Rank or score (starting with highest ranked/scored)*	*Willingness to Pay*
e.g. more information on …	*8*		*50% more than current tarriff*
e.g. better metering system	*5*		*20% more*
e.g. suggested mechanism for information delivery	*etc.*		*Not mentioned*

Summary of Discussion and Quotes:

Additional Comments:

Wrap – Up *[5 min]*

Thank FGD respondents for allocating [1.5-2 hours] of their time to answer the questions. Emphasize that their answers are very important and valuable and will be used to inform water supply strategies and options carried out by the Government of Uzbekistan. Re-emphasize that their anonymity will be respected.

General Provisions

A minimum of two people should facilitate the FGDs: 1) a main moderator, with extensive experience of conducting FGDs, and 2) a note-taker/ second facilitator. All FGDs should be recorded, to allow anyone to go back and check responses if insufficient information is provided in the write-ups and tables. All notes and flip charts used during the FGDs should be kept. Since the qualitative assessment aims to understand impact on and attitudes to WSS service delivery changes among different groups of consumers, it is very important to retain stories and experiences shared by respondents. The narrative write-ups should include vivid quotes that illustrate different points of view. All quotes should include proper references (locale, type of FGs, gender, age and occupation of the respondent). Responses that required prompting by the facilitator should be noted. The facilitator should keep the discussions of any given issue "on track" and remind respondents that the FGD may not cover all of the raised issues. However, concerns should be noted and if possible, ranked based on their relevance and extent of importance to the respondents. The moderator should note any age or gender variations in answers, pose follow-up questions to explore these variations and record the noted differences carefully for the final report.

ANNEX E. REVIEW OF DRINKING WATER AND SANITATION REFORM IN EUROPE AND CENTRAL ASIA

ECA countries have faced common challenges to maintain over-sized, inefficient infrastructure from the Soviet period. Amongst other challenges, including lack of operation and maintenance, insufficient finance, weak institutions, and only partial decentralization, ECA countries have often managed to maintain access but experienced steady declines in levels and quality of service and infrastructure (OECD 2011). These have had negative consequences for human health, the environment and economic development.

Uzbekistan finds itself in a 'low-level equilibrium trap' with regard to WSS service. The literature describes this trap as being characterized by features such as political interference in service delivery, inadequate investment and reinvestment to expand and/or maintain the system, low tariffs insufficient to cover expenses (below the marginal cost of provision), low consumer expectations regarding service quality and low willingness to pay, non-payment by customers and low levels of enforcement by agencies, and deteriorating service quality linked in a vicious cycle (Savedoff & Spiller 1999, Walker 1999, (Singh *et al*. 1993, Altaf *et al.* 1993, Spiller and Savedoff 1999 (in Davis & Whittington nd)), Herrera & Post 2014). This leads to systems needing to be funded out of national funds rather than user fees, or more likely not being funded at all, and hence becomes difficult to finance. This also effectively subsidizes households with access to water (Walker 1999) and prevents extension of services to unconnected households.

Box C1 describes the Soviet legacy that has contributed to the low-level equilibrium trap in Uzbekistan and other ECA countries.

Box E1 – Soviet legacy for WSS systems

The infrastructure built during the Soviet era was relatively reliable albeit capital intensive. This can be explained by the fact that, at the time, the benchmark water consumption (consumption norms) and the planning standards (including the spare capacity in the event that water consumption grows in the long-term) were set at an excessively high level (frugal water consumption was not encouraged at that time). During the Soviet period, water pricing was focused solely on the objective of poverty alleviation, seeing water as a human right and attempting to provide free service to everyone. Cost recovery objectives were ignored, meaning financial resources had to be obtained from other sectors of the economy. This created macroeconomic distortions as the economic system struggled to meet such unfunded liabilities. Today these bills are coming due in the form of run-down utilities. Also, because water was provided free it was not used efficiently by consumers. The water supply system was overly expensive because the public sector attempted to treat and deliver more water to households than they really wanted or were willing to pay for. Water utilities did not have their own revenue streams and could not obtain sufficient resources from higher levels of government, meaning that water distribution systems became unreliable.

The end of the Soviet era led to substantial transfers of responsibilities to local governments in most countries and associated decentralization of water and sanitation services. This, in some cases, led to over-fragmentation of water and sanitation operators and created a number of challenges, such as inefficient scale of operations and difficulties to access financing – rural water services have particularly suffered from over-fragmentation. In many places, it was not possible to maintain access to water supply services, and some wastewater treatment facilities simply stopped operating. Inefficiency further increased because households left their taps open in the hope of collecting and storing water when it became available. So a policy of "free water" not only meant that the cost recovery and economic efficiency objectives were not met, but also that service quality itself declined.

Information sourced from Whittington (2003) & OECD (2011).

Related to the low-level equilibrium trap, the European Bank for Reconstruction and Development (EBRD) compiles a WSS sector transition index[42], tracking the extent to which the countries in the region have implemented reforms that enable open and democratic market economies in the sector. The index ranks Uzbekistan at the lower end of the ECA region with key challenges including improvements in the technical, operational and financial performance of utilities, the rehabilitation of physical infrastructure, the clear separation of operating companies from regulatory bodies and the establishment of sound regulation (EBRD 2010 in OECD 2011).

Regional examples of how to get out of a low-level equilibrium trap?

Some ECA countries have overcome elements of the low-level equilibrium trap and provide examples of successful approaches that could be scaled-up and replicated (OECD 2011). In 2000, ECA countries endorsed the 'Almaty Guiding Principles for Reform of Water Supply and Sanitation in New Independent States' to reverse the deterioration of water services. Some ECA countries have successfully implemented approaches which are yielding positive results, and selected examples are outlined below.

Private sector p!articipation (PSP)

It is estimated that 20 percent of the 2008 ECA population is served by operators with private sector participation (PSP), a more than doubling since 2004 (OECD 2011). PSP ranges from 53 percent in Armenia (a 50 percent growth compared to 2004) down to zero percent in Uzbekistan.

With regard to Uzbekistan, OECD (2011) reports that the appetite for PSP was reduced after the failure of two successive contracts with international private operators in Bukhara and Samarkand. However, there is a declared political will to facilitate PSP and more positive experiences from countries such as Armenia, Kazakhstan, Russian Federation and Georgia – particularly the pace of growth – could serve as a revised model for Uzbekistan.

Improved enabling environments encouraged private operator involvement and helped enhance the performance of water utilities in Armenia, Kazakhstan, Russian Federation and Georgia. OECD (2011) reports that in the Russian Federation, private operators have in many cases been 'agents of positive change' in the sector; in Armenia the international private operator substantially improved the performance of the Armenian Water and Sewerage Company; and in the Kyrgyz Republic, a small domestic private operator managed to transform the local water utility from a chronic loss-maker into a profitable entity. However, authors such as Davis & Whittington (nd) caution about relying too greatly on PSP to play a significant role in water sector reform and instead encourage transition economies such as Uzbekistan to focus on creating adequate enabling environments and then eliciting more interest from private firms.

Closing funding gaps and strategy for tariff increases

Over the past decade, the WSS sector has received a declining share of domestic public funding in most ECA countries (OECD 2011). Concurrently, international finance (through donors, etc.) has been greater in some countries and less in others (such as Uzbekistan). This has led to a failure to adequately value the costs of poor water policy and the potential benefits of investment (*ibid.*).

WSS tariffs in the region are at or below 0.4 US$/m^3 in seven of twelve ECA countries – insufficient to cover O&M costs (OECD 2011). Revenues from water sales in Uzbekistan are among the lowest in the ECA region and remain close to their 1990 levels (OECD 2011).

Uzbekistan has the lowest operating cost coverage ratio of the ECA countries – this is a financially unstable situation (OECD 2011). In 2009, the average tariff for households in Uzbekistan covered 90 percent of operating costs alone (OECD 2011). In such a case, water sales cannot finance appropriate maintenance and capital expenditure.

ECA countries should support the emergence of utilities whose operations can be financed by tariffs so that they can concentrate their support on capital investment and social protection (OECD 2011). There appears to be scope in many ECA countries to raise tariffs further, if service quality improves, and in conjunction with targeted support for poorer sections of the population who would be adversely affected by such price increases (OECD 2011).

42 An index value of 4 is for a country that has 'fully transitioned'. Uzbekistan rating was just over 1.5 in 2010.

Armenia has made significant efforts to improve their tariff-setting frameworks to better reflect economic realities and to insulate tariff-setting from excessive political interference. Importantly, Armenia's tariff increases were accompanied by substantial improvements in key service provisions for customers, such as regularity of drinking water supply (Khachatryan 2009 in OECD 2011). Armenia is a case where tariff increases have generated more revenue for the water utilities and customers have received improved service. Analysis in Armenia showed that a certain level of tariffs and collection rate would allow covering O&M costs of the service in urban areas after a transition period. Additional analysis confirmed that this level of tariff was affordable for 90 percent of the population and helped design targeted measures to support the lowest decile that could not afford paying their water bills as well as other essential goods and services (OECD 2011).

Subsidies only for Capital Expenditures, not Operational Expenditures

In ECA countries, significant state transfers (financed from taxes) are used to cover the shortfall between tariff revenues and costs, thus leading to the provision of O&M subsidies, rather than on capital expenditure. A key issue with such transfers is that the amounts effectively disbursed are often lower than those committed, which results in a high degree of unpredictability of water and sewerage utility providers (OECD 2011). Examples from Armenia and the Russian Federation illustrate the challenges of eliminating OpEx subsidies. In Armenia, only about 20 percent of the committed funds for operational subsidies had been effectively disbursed in 2008 and 2009. Over time, central governments are looking to decrease such transfers to the utilities (OECD 2011). In the Russian Federation, public transfers from various levels of government account for more than 50 percent of the value of capital investments in the WSS sector. For example, in 2009, total capital investments in the water sector were estimated at RUR 57 190 million (EUR 1 570 million) and public budgets had funded roughly 50 percent of that total (*ibid.*). Part of these transfers was channeled via the specially-established Russian Federation Investment Fund.

Maintaining, renovating and in some cases, down-sizing infrastructure

A critical priority in ECA countries consists of maintaining, renovating and in some cases, down-sizing infrastructure (when oversized assets are expensive to operate) (OECD 2011). OECD (2011) analysis found that in the ECA region, even if tariffs were increased up to an average of 5 percent of household income (with social protection measures to support the poorest who would pay more than this average), user charges would only generate about 50 percent of cash flow needs for the foreseeable future, going up to 95 percent by 2028. Therefore, prioritization of investments is recommended, starting with investments to reduce water related morbidity and halt the deterioration of existing infrastructure. Further to this, Davis & Whittington (nd), in a study on Ukraine's WSS network, find that the Soviet legacy infrastructure is overbuilt in the sense that the capital stock exceeds the ability of the economic base to maintain it (9 in Davis & Whittington nd). If so, economic theory suggests that the existing water supply infrastructure should be allowed to deteriorate until it adjusts to a lower, socially optimal level. Even 'strategic disinvestment' approaches focusing on incremental improvements to some parts of the capital stock (while allowing others to deteriorate) may not result in perceptible service improvement to many households (*ibid.*). However, prioritizing investments in service levels and regions that generate the highest benefits at least cost (e.g. improved sanitation in rural areas) (OECD 2011) may be preferential.

Increasing water metering

The share of households in the ECA region with water meters is relatively low. Meters are most common in Moldova and Belarus (over 90 and 80 percent respectively) and just over 30 percent in Uzbekistan (OECD 2011). Installing meters can be a costly and technically challenging undertaking (Davis & Whittington nd).

Moldova and Armenia provide good examples of mixed experiences with metering programs (as reported by OECD 2011). (i) Moldova promoted nationwide installation of water meters which led to significant reductions in user charges revenue because of differences between housing water consumption norms and the volume of water actually consumed based on meter readings. This generated a difficult financial situation for WSS utilities. Besides, cross-subsidizing of domestic water tariffs at the expense of commercial and industrial users prompted many of them to drill their own boreholes instead of using water supply services. This again reduced revenues from user charges for water utilities. (ii) Armenia has taken drastic actions to increase water metering. To that end, a water use metering strategy was designed and implemented. This helped reduce water consumption, water leaks, production costs, and increase collection rate. In Yerevan, Armenia, a metering program reached more than 80 percent of connections. This has significantly driven down consumption, which is now in line with Western Europe averages. Yet the problem of how to accurately meter water use in multifamily houses/apartment blocks persists. While attention focused on metering domestic (indoor) water use, unaccounted-for water related to water supplies to apartment blocks has grown and generated significant losses for utilities.

Improving rural WSS service coverage

About 20 percent of the rural population in ECA does not have improved access to safe drinking water (OECD 2011). To date, much international assistance and public domestic spending has been focused on large investments in major centers whereas many acute problems are in smaller centers and rural areas. Since the early 1990s, the situation in rural areas has improved remarkably in countries such as Armenia, Azerbaijan and Georgia, but has deteriorated in Uzbekistan.

While many of the ECA governments have been slow to react to the rural water situation, some such as the Kyrgyz Republic have developed a rural water sector policy. Also, Armenia initiated a national policy dialogue on Financing Rural Water Supply which helped identify realistic policy objectives for minimal water supply standards for rural populations, which are being incorporated in the legislative framework (OECD 2011).

Determining the appropriate scale and scope of water systems (decentralization / aggregation)

Decentralization has occurred in ECA countries to varying degrees and with varying levels of success. Box C outlines common challenges encountered by decentralized WSS systems in ECA countries based on an assessment by OECD / EAP Task Force (2009).

Box E2 – Common challenges encountered by decentralized WSS systems in ECA countries

Regulatory / Legal

- Ownership rights not always located at municipal level, or not clearly defined.
- Unclear distribution of responsibilities for tariff regulation.
- Difficulties with obtaining licenses and permits.

Administrative / Organizational

- Administrative structure is inefficient from the economic development perspective (great number of medium-sized and small municipalities).
- Lack of coordinating mechanisms between the different levels of government (oblast, Raion, and village levels) and the water suppliers in rural areas.
- Lack of institutional structures allowing citizens to participate in decision making processes related to water supply infrastructure operations and development.

Fiscal / financial

- A great number of water supply services are not financially and fiscally independent.
- Existing state budget financing of capital investment projects in water supply is unpredictable and unreliable even for the short-term planning.
- The share of total revenues that remain with the local budgets is not adequate to the needs of the communities.
- The choice of possible local taxes and fees is not adequate for local governments performing service provision functions to generate revenues.
- Lack of direct financial relations between the local governments and the national budget.
- Rural local self-governments are not allowed to borrow.
- Lack of financial resources for water companies mostly in rural areas to fund operations and capital investment.

Capacity

- Insufficient number of staff in local governments are responsible for coordination and control of rural water supply sector.
- Lack of expertise of rural local governments regarding public law, contractual arrangements, interactions between utility providers, tariff procedures and regulatory impact assessment, raising external financing for infrastructure development.
- Lack of skills among rural water operators to raise external financing on the basis of quality investment projects / business plans.
- Lack of experience with pro-active maintenance practices.
- Lack of equipment and tools to monitor efficiency of the water systems (i.e. leak detection equipment), to maintain and rehabilitate the water infrastructure.

Source: OECD / EAP Task Force (2009) in OECD 2011.

ANNEX E. REVIEW OF DRINKING WATER AND SANITATION REFORM IN EUROPE AND CENTRAL ASIA

In some countries, decentralization has led to over-fragmentation with negative impacts, as utilities may be too small to operate, maintain and finance infrastructure needs (OECD 2011). In response, some countries have aggregated neighboring water utilities or created regional companies or even national companies. Several countries have commenced this reform, but Uzbekistan is among the countries that remain tied to the decentralized approach. In particular, Armenia, Georgia, the Kyrgyz Republic, Moldova, and Ukraine have moved towards some aggregation of the municipal water sector with the objectives of simplifying tariff regulation, attracting more finance for investment into the sector, generating economies of scale, and encouraging cross-subsidization of utilities.

Taking Georgia as a specific example, the WSS Sector Reform Strategy, designed with USAID support, envisaged setting up regional water companies to help achieve economies of scale and remove some resource limitations (including shortages of staff). At the beginning of 2009, almost 60 municipal water supply and sanitation utilities were integrated, and two new legal entities were created. This integration aimed to improve the technical and financial conditions of utilities and pave the way for future privatization. Later in 2009, it was decided to go further with consolidation, with one new integrated national company replacing the two companies. However, just as devolution to local authorities is not a panacea, regional operators are not necessarily the optimal option. Economies of scale and scope have to be considered for a country like Uzbekistan.

ANNEX F. TARIFFS AND CONSIDERATIONS FOR TARIFF STRUCTURE CHANGES

1. Issues to consider for any potential tariff reforms

A tariff structure is a set of procedural rules used to determine the conditions of service and the monthly bills for water users in various categories or classes (Whittington 2006, Boland & Whittington nd). It is a tool capable of promoting a number of objectives, although tradeoffs among them are commonly required. Primary issues to consider when setting tariffs are (Boland & Whittington nd, Whittington 2003, 2006):

- *Revenue sufficiency / cost recovery*. From the water supplier's point of view, the main purpose of the tariff is cost recovery. Before design can begin, there must be a decision as to how much revenue the tariff should recover. The revenue from water users should be sufficient to pay the operation and maintenance costs of the water utility's operations, repay loans undertaken to replace and expand the capital stock, provide a return on capital at risk and maintain a cash reserve for unforeseen events.
- *Economic efficiency*. An efficient tariff will create incentives that insure, for a fixed water supply cost, that users obtain the largest possible aggregate benefits. A different, but equivalent statement of this objective is that for a given level of aggregate benefits from water use, the supply cost should be minimized. Prices should signal to consumers the financial, environmental, and other costs that their decisions to use water impose on the rest of the system and on the economy.
- *Equity and fairness*. Equity requires that equals be treated equally, and that unequals be treated unequally. In public utility tariff design, this usually means that users pay amounts which are proportionate to the costs they impose on the utility. Equity is thus a quantifiable proposition, subject to precise definition and verification. Fairness, on the other hand, is wholly subjective. Each participant in a tariff design process may have a different notion of the meaning of fairness.
- *Income redistribution*. Although this objective may be considered part of fairness, it is so often explicitly stated that it requires separate treatment. Briefly, it is widely assumed in developing countries that utility tariffs should be used to redistribute income among groups of customers.
- *Resource conservation*. Water tariffs are often called upon to discourage "excessive" or "wasteful" uses of water, thus promoting the conservation of depletable sources, or the sustainable use of renewable water sources. If one assumes that large users of water are the most likely to engage in "excessive" or "wasteful" use, then the IBT design confronts those users with higher prices and thus discourages further use. This notion, of course, rests on the belief that only large users can waste water. It also assumes that these users are aware of the tariff design and of the significance of the various thresholds, and can respond accordingly.
- *Poverty alleviation / affordability*. Many people feel that water services are a "basic right" and should be provided to people regardless of whether or not they can pay (Charging for water may also be perceived as inappropriate on cultural or religious grounds. For example, in Islamic societies it is often considered wrong to charge for water *per se*, although asking people to pay for the infrastructure to deliver water is typically acceptable). This objective leads many people to recommend that water services be provided free, at least to the poor. Providing water free through private connections conflicts with the objectives of cost recovery and efficient water use. One objective of tariff design is to ensure that poor households are able to obtain adequate supplies of clean water.

Secondary issues to consider include:

- *Public acceptability*. A successful tariff design is one that is not controversial, or which does not serve as a focus of public criticism of the water supply agency.
- *Political acceptability*. A tariff design that is objectionable to political leaders will lead to loss of political support and may cause increased political interference in the operations of the agency.
- *Simplicity and transparency*. A tariff design should be easy to explain and easy to understand. It should be possible for most users to know what price they are paying for water.
- *Net revenue stability*. When water use changes as a consequence of weather or economic conditions, revenue and cost should change by approximately equal amounts. When this does not happen, cyclical changes will result in net revenue volatility, creating cash flow and financing difficulties for the agency.
- *Ease of implementation*. The promulgation and implementation of the revised tariff should not encounter significant barriers in terms of legal authority, administration competence, information requirements, or billing procedures.

ANNEX F. TARIFFS AND CONSIDERATIONS FOR TARIFF STRUCTURE CHANGES

2. Types of tariffs to consider

There are two general types of tariffs for consideration: (i) single-part tariffs, and (ii) two-part tariffs.

Single-part tariffs

Single-part tariffs can be based upon either fixed-charges or volumetric charges.

Fixed-charges are the only possible tariff structure in the absence of metering. With a fixed charge the consumer's monthly water bill is the same regardless of the volume used (although it can vary across households or consumer classes depending on characteristics of the consumer). With this charge, consumers have no incentive to economize on water use, as using more water will not increase their water bill. Also, customers that do have a connection can supply water to other users (e.g. unconnected households, vendors) without incurring an increase in the household water bill. WSS service providers may be reluctant to expand coverage because more customers may mean more financial losses. Fixed-charge tariffs are thus especially prone to locking communities into low-level equilibrium traps of few customers, low revenues, and poor service (Whittington et al.1990).

Volumetric charges base consumers' water bills on the amount of water they use. All volumetric charges require that the consumer has a metered connection and that this meter works reliably and is read on a periodic basis. In mathematical terms, the monthly water bill is thus a function of the quantity of water a consumer uses. The precise formula used for the calculation of the water bill can differ. There are three main options:

(i) *a uniform volumetric charge,* where the household's water bill is simply the quantity used (e.g., cubic meters) times the price per unit of water (e.g., US$ per cubic meter).

(ii) *a block tariff,* where the unit charge is specified over a range of water use for a specific consumer, and then shifts as use increases – they create a stepwise price structure. With an increasing block tariff (IBT), consumers incur a low volumetric per-unit charge (price) up to a specified quantity (or "block"); for any additional water consumed, they pay a higher price up to the limit for a second block, even higher for the third, and so on. It may or may not be accompanied by a nonuse component.The rationale commonly given for an IBT structure is that, in theory, it can achieve three objectives simultaneously. It promotes affordability by providing the poor with affordable access to a "subsistence block" of water (the "lifeline" rate). It can achieve efficiency by confronting consumers in the highest price block with the marginal cost of using water. And it can raise sufficient revenues to recover costs; and

(iii) *an increasing linear tariff*, whereby the unit charge increases linearly as water use increases - the price that a consumer pays per unit increases continuously (rather than in block increments) as the quantity of water used increases. This tariff structure sends the consumer a powerful signal that increased water use is costly.

Two-part tariffs

With a two-part tariff, the consumer's water bill is based on the sum of two calculations: (i) a fixed charge, and (ii) a charge related to the amount of water used. There are many variations in the way these two components can be put together. The fixed charge can be either positive (a flat fee) or negative (a rebate). The water use charge can be based on any of the volumetric tariff structures described above (a uniform volumetric tariff, an increasing or decreasing block tariff, or an increasing linear tariff.) In many cases, the fixed charge is kept uniform across customers and relatively low in value, and is used simply as a device for recovering the fixed administrative costs associated with meter reading and billing that are unrelated to the level of water consumption.

ANNEX G. ANALYTICAL APPROACH FOR CALCULATING THE ASSET INDEX USING THE QUANTITATIVE SURVEY

This annex presents the analytical approach used for calculating an asset index of the quantitative conducted for this study (n=300). Expenditure data collected through the survey are limited in scope. In order to arrive at a more robust method for forming wealth groups among the surveyed households, asset indices are created as and used to check the robustness of the expenditure data in the survey.

1. Approach

(1) Asset Indices

Six asset indices were constructed using factor analysis. In order to do so, asset indicators in the survey are grouped in 5 categories: assets, water, toilet, housing, and electricity and gas Table G1`.

Table G1. Variables used in the calculation of the asset indices (Assets)

	Observations	No of households (HH) with the asset	No of HH without the asset	Percentage of HH with the asset (%)
Usual TV	300	255	45	85.00
Plasma TV, LCD	300	91	209	30.33
DVD, the video player	300	166	134	53.33
Computer, laptop	300	74	226	24.67
Tablet	300	9	291	3.00
Smartphone	300	38	262	12.67
Split A/C (winter/summer)	300	38	262	12.67
Washing machine (Soviet-style)	300	49	251	16.33
Washing machine	300	39	261	13.00
Boiler for hot water	300	15	285	5.00
Microwave oven	300	43	257	14.33
Fridge	300	254	46	84.67
Gas-stove	300	287	13	95.67
Car up to 2000 year	300	37	263	12.33
Car after the 2000 release	300	81	219	27.00
Anything	300	2	298	0.67

Six asset indices were constructed by using all or part of the categorized asset indicators (see below).

(2) Expenditure data

The monthly household expenditure aggregate was constructed by averaging all household expenditures for winter and summer months (q45_1S, q45_1W). However, expenditure aggregates are not spatially deflated to adjust for regional prices differences due to lack of data.

Averaged monthly household expenditure were then adjusted to consider the economies of scale within household. Filmer and Scott (2008) use the formula described below, where α is the equivalence between children and adults, and θ accounts for economies of scale.

$$\text{Adj. Expenditures} = (\text{Total Expenditures}) / (\alpha * \text{No. of Children} + \text{No. of Adults})^{\theta} \quad (1)$$

Then the congruence with asset indices in rankings at different values of α and θ were then estimated. Adult equivalence α is set to 1 because adult equivalence does not generally affect the results (Filmer & Scott, 2008). Economies of scale parameter θ is tested between 0 and 1 using the *ad hoc* approach used by Deaton and Zaidi (2002), which was also adopted by Filmer and Scott (2008).

ANNEX G. ANALYTICAL APPROACH FOR CALCULATING THE ASSET INDEX USING THE QUANTITATIVE SURVEY

2. Analytical steps

Asset Indices

Most asset indicators are recoded to binary variable of 0 and 1, with the exception of continuous variable for number of employed household member in this survey.

- Assets in q93_1-q93_13 are recoded to binary variables of q93_1-q93_99 to match the description in codebook.xlsx, where each question is linked to following 16 assets:
- Level of education of the household head (q91h) is used as human capital - education indicator. Level of education of the respondent (q91r) is not included.
- Employment status of household head (q92h) and number of working members in the household (q86) are used as human capital - employment indicator. Employment status of respondent (q92r) is not included.
- Type of basic housing (q87), floor living in (q88), number of floors in the house (q88_1) and property type of the basic housing (q89) are used as housing variable.
- "access to electricity" and "access to gas" is created by from seasonal expenditure for electricity (q44_1w, q44_1s) and gas (q44_2w, q44_2s). If there is expense from the utility in either winter or summer month, it is considered that the household has access to the energy source.

A tentative "asset score" is created as the sum of all asset indicators listed above, before conducting factor analysis.

Asset indicators are grouped to construct 6 asset indices

1) asset index with all indicators: q91h1-q93_99
2) asset index without education indicators: q92h1-q93_99
3) asset index without employment indicators: q91h1-q91h3 electricity-q93_99
4) asset index without electricity and gas indicators: q91h1-q86 q871-q93_99
5) asset index without housing indicators: q91h1-gas q93_1-q93_99
6) asset index with assets only: q93_1-q93_99

Only asset indicators used for each asset index, and identification variables were kept.

We removed asset variables that i) have no observations, ii) for which all observations have the same value, or iii) for which the standard deviation is smaller than 0.05 for asset indicators if the household has at least one asset indicator.Subsequently asset indices were created using factor analysis. Six asset indices were created and rank and quintiles were computed according to the index.

Expenditure data

Monthly household expenditure was constructed by averaging all household expenditures for winter and summer months (q45_1S, q45_1W). Since the expenditure states "all expenditure" in the household, seasonal monthly expenditures for electricity (q44_1w, q44_1s), gas (q44_2w, q44_2s), drinking water (q44_3w, q44_3s) are not added. Irregular expenditures, such as one-off expenditures for water storage or sanitation system, are also excluded.

Monthly household expenditure was then adjusted by household size using economies of scale parameter θ in formula (1). In order to find the θ that has highest congruence with asset indices, 11 values of adjusted household expenditures are created by incrementing the value of θ by 0.1 between 0 and 1(hh_exp_pc10-hh_exp_pc110). Note that the equivalence between children and adults parameter α is fixed at 1. Note that household weight is not included in both expenditure data and asset indices due to lack of data.

Comparison of asset indices and expenditure data. Pairwise correlation and Spearman rank correlation are used to compare 1) 6 asset indices with different set of asset indicators and 2) adjusted household expenditure created by 11 different economies of scale parameter θ, between 0 and 1 with 0.1 increments. Both asset scores, rank and quintiles are used to find the θ with the highest congruence.

3. Results

(1) Economies of scale parameter (θ) for adjusted expenditure and congruence with asset indices

The expenditure data and asset indices generates different results, part of it owing to the fact that the expenditure data adjust for household size, while asset indices do not. Therefore, in order to adjust the expenditure data to find highest congruence with asset indices, the optimal value of the economies of scale parameter (θ) between 0 and 1 were tested. However, adult equivalence α is set to 1 because adult equivalence does not generally affect the results (Filmer & Scott, 2008) as noted above.

Adj. Expenditures = (Total Expenditures) / (α*No. of Children + No. of Adults)$^{\theta}$ (1)

11 values of economies of scale parameter θ, between 0 and 1 with increments of 0.1, were applied to find θ with the highest congruence. Unlike the inverse U-shaped pattern described by Filmer and Scott (2008) whose correlation coefficient is lowest when scaling values are 0 or 1 and highest in-between, rank correlation comparison in the six asset indices either increased or decreased as θ increased in most cases.

Despite some differences in the three comparison methods, the congruence is highest in each comparison when θ is 1.0 at asset index (3), the asset index without employment indicators. θ value of 1.0 also generates most number of highest congruence for asset indices. Therefore, θ is set at 1.0, which makes adjusted expenditure with the highest congruence same as expenditure per capita.

(2) Relative rankings

This section assesses household ranking generated by different methods by 1) comparisons of relative rankings and 2) overlapping the poorer quintiles generated by each methods. As said, θ was set at 1.0, and the adjusted expenditure value, identical to expenditure per capita, is used to compare with the asset indices.

Household rankings. The six asset indices and expenditure data show statistically significantly related household rankings. All rank correlation coefficients for asset indices and adjusted expenditure are compared in Table G2 fall under statistical significance level under 0.01.

As can be expected, rankings between asset indices are higher, with the lowest rank correlation coefficient higher than 0.75. Rank correlation between six asset indices are higher within two groups of asset indices: (1) through (4), and (5) and (6). Within each groups, rank correlation coefficients are higher than 0.9.

Per capita household expenditure and the six asset indices are scattered at significantly lower values between 0.25 and 0.38. Asset indices between (1) and (4) have higher correlation coefficient above 0.34, while asset indices (5) and (6) have lower value around 0.25.

Table G2 Spearman rank correlation coefficients between asset index and adjusted household expenditure

Per Capita Household Expenditure	Asset Index with All Indicators (1)	Asset Index without Education Indicators (2)	Asset Index without Employment Indicators (3)	Asset Index without Electricity and Gas Indicators (4)	Asset Index without Housing Indicators (5)	Asset Index with Assets Only (6)
Correlation with ranking by per capita household expenditures						
1	0.3634	0.3475	0.3813	0.364	0.2535	0.2567
0.3634	**1**	0.9745	0.9654	0.9963	0.8147	0.7541
0.3475	0.9745	**1**	0.9303	0.9692	0.7741	0.7506
0.3813	0.9654	0.9303	**1**	0.9619	0.8282	0.8045
0.364	0.9963	0.9692	0.9619	**1**	0.8107	0.7561
0.2535	0.8147	0.7741	0.8282	0.8107	**1**	0.9553
0.2567	0.7541	0.7506	0.8045	0.7561	0.9553	**1**

Note: Largest values by each index are in bold.

Overlap in classifications. Using the economies of scale parameter θ at 1, the overlap in asset indices quintiles and adjusted expenditure quintiles are compared in 3 categories. Table G3 shows comparison between 1) the poorest quintiles (top 2 panels), 2) the poorest quintile and the poorest two quintiles (40%) (middle 2 panels), and 3) the poorest two quintiles (40%) (bottom two panels). In each comparison, household expenditure per capita, asset index with all indicators (1), asset index without employment indicators (3), and asset index with assets only (6) are used as the base for comparison.

Naturally, the proportion of per capita household expenditure overlapping with other asset indices is smaller than the proportion of asset indices overlapping with other asset indices. Only one fifth of the people categorized as being in the poorest 20% by expenditure data are categorized in the same quintile for 6 asset indices (top panel of Table G3), but the proportion of overlap rises up to 0.48 when the poorest 40% are compared (bottom panel of Table G3). Overlaps with asset indices (1) through (3) are higher than those of other asset indices.

On the other hand, the overlap in the poorer in quintiles between asset indices is higher. Among the three asset indices that are used, asset index with all indicators (1) are overlap most with other asset indices, in both comparison to poorest quintile with poorest 40% of other indices.

ANNEX G. ANALYTICAL APPROACH FOR CALCULATING THE ASSET INDEX USING THE QUANTITATIVE SURVEY

Table G3 Overlap in the classification in the poorer quintiles

Per Capita Household Expenditure	Asset Index with All Indicators (1)	Asset Index without Education Indicators (2)	Asset Index without Employment Indicators (3)	Asset Index without Electricity and Gas Indicators (4)	Asset Index without Housing Indicators (5)	Asset Index with Assets Only (6)
Proportion of the population classified in the poorest 20 percent by per capita household expenditure who are in the poorest 20 percent according to other asset indices						
1	0.2167	0.2333	0.2167	0.2333	0.2	0.2667
Proportion of the population classified in the poorest 20 percent by asset index using all indicators (1) who are in the poorest 20 percent according to other welfare indices						
0.2407	1	0.8333	0.7037	0.9074	0.6667	0.5926
Proportion of the population classified in the poorest 20 percent by asset index without employment indicators (3) who are in the poorest 20 percent according to other welfare indices						
0.2364	0.6909	0.5818	1	0.6727	0.6727	0.6727
Proportion of the population classified in the poorest 20 percent by asset index with assets only (6) who are in the poorest 20 percent according to other welfare indices						
0.2500	0.5000	0.4688	0.5781	0.5000	0.6719	1
Proportion of the population classified in the poorest 20 percent by per capita household expenditure who are in the poorest 40 percent according to other asset indices						
1	0.4833	0.4833	0.4500	0.4500	0.4000	0.3667
Proportion of the population classified in the poorest 20 percent by asset index using all indicators (1) who are in the poorest 40 percent according to other asset indices						
0.4815	1	1	1	1	0.9630	0.9074
Proportion of the population classified in the poorest 20 percent by asset index without employment indicators (3) who are in the poorest 40 percent according to other welfare indices						
0.5273	1	0.9455	1	1	1	1
Proportion of the population classified in the poorest 20 percent by asset index with assets only (6) who are in the poorest 40 percent according to other welfare indices						
0.5000	0.8281	0.8281	0.8125	0.8281	0.9688	1
Proportion of the population classified in the poorest 40 percent by per capita household expenditure who are in the poorest 40 percent according to other asset indices						
1	0.4701	0.4701	0.4701	0.4615	0.4359	0.4359
Proportion of the population classified in the poorest 40 percent by asset index using all indicators (1) who are in the poorest 40 percent according to other asset indices						
0.4867	1	0.9026	0.8938	0.9646	0.8496	0.7699
Proportion of the population classified in the poorest 40 percent by asset index without employment indicators (3) who are in the poorest 40 percent according to other welfare indices						
0.4867	0.8938	0.8407	1	0.8850	0.8673	0.8230
Proportion of the population classified in the poorest 40 percent by asset index with assets only (6) who are in the poorest 40 percent according to other welfare indices						
0.4474	0.7632	0.7719	0.8158	0.7719	0.8947	1

Table G4. Household expenditure per capita (θ=1) regressed on all asset indicators

Source	SS	df MS		Number of obs	288
				F(49, 238)	3.98
Model	1900107	49 38777.6908		Prob > F	0
Residual	2316826	238 9734.56332		R-squared	0.4506
				Adj R-squared	0.3375
Total	4216933	287 14693.1461		Root MSE	98.664
Household Expenditure per capita (θ=1)	**Coef.**	**Std. Err. t**	**P>t**	**[95% Conf.**	**Interval]**
HHH edu -primary	-39.2244	75.07057 -0.52	0.602	-187.112	108.6632
HHH edu- secondary	17.67584	73.89816 0.24	0.811	-127.902	163.2538
HHH edu- higher	-5.9805	74.44716 -0.08	0.936	-152.64	140.679
HHH employed in private sector	-50.603	49.02534 -1.03	0.303	-147.182	45.97597
HHH state employee	-39.9289	48.32283 -0.83	0.409	-135.124	55.26614
HHH worker of HH/Tamorka	17.61177	55.7644 0.32	0.752	-92.2431	127.4666
HHH seasonal worker	-41.1025	50.07509 -0.82	0.413	-139.75	57.54448
HHH farmer	9.512143	66.61624 0.14	0.887	-121.721	140.7449
HHH unemployed	-39.2537	62.30283 -0.63	0.529	-161.989	83.48169
HHH housekeeper	-50.6787	54.68762 -0.93	0.355	-158.412	57.05494
HHH pensioner	-35.0421	47.25645 -0.74	0.459	-128.136	58.05222
No. of working members in HH	-5.65261	4.348093 -1.30	0.195	-14.2183	2.913052
Access to gas	3.440743	20.58875 0.17	0.867	-37.1187	44.0002
Live in private apartment	130.6947	157.3314 0.83	0.407	-179.245	440.6346
Live in government apartment	-66.169	171.9704 -0.38	0.701	-404.948	272.6096
Live in 1-story private house w/landplot	50.62307	101.5534 0.50	0.619	-149.435	250.6814
Live in 1-story private house w/o landplot	-13.258	142.3183 -0.09	0.926	-293.623	267.1064
Live in 2/3-story private house w/ landplot	51.8501	104.1017 0.50	0.619	-153.228	256.9285

ANNEX G. ANALYTICAL APPROACH FOR CALCULATING THE ASSET INDEX USING THE QUANTITATIVE SURVEY

Household Expenditure per capita (θ=1)	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
Live in 2/3-story private house w/ olandplot	40.55755	127.4625 0.32	0.751	-210.541	291.6562
Live in 1st floor	0.300734	145.7564 0.00	0.998	-286.837	287.4381
Live in 2nd floor	-94.0538	153.5633 -0.61	0.541	-396.571	208.4632
Live in 3rd floor	-116.203	161.4224 -0.72	0.472	-434.202	201.7963
Live in 4th floor	-155.086	159.339 -0.97	0.331	-468.981	158.8088
Live in 5th floor	17.60356	146.3103 0.12	0.904	-270.625	305.8321
Live in 6th floor	-82.181	142.7196 -0.58	0.565	-363.336	198.9739
Live in 7th floor	29.1437	145.8545 0.20	0.842	-258.187	316.4744
Live in 8th floor	13.47112	142.6378 0.09	0.925	-267.523	294.465
Live in 9th floor	0	(omitted)			
Live in 11th floor	-112.814	143.7459 -0.78	0.433	-395.991	170.3625
2 floors in the house	175.2432	206.511 0.85	0.397	-231.58	582.066
3 floors in the house	-25.3819	207.502 -0.12	0.903	-434.157	383.3932
4 floors in the house	101.374	197.9484 0.51	0.609	-288.581	491.3288
9 floors in the house	56.04673	160.5214 0.35	0.727	-260.178	372.271
Own dwelling	26.29384	46.39149 0.57	0.571	-65.0965	117.6842
Usual TV	-38.0831	22.85899 -1.67	0.097	-83.1149	6.948724
Plasma TV, LCD	9.716652	16.91868 0.57	0.566	-23.6128	43.04615
DVD, the video player	-15.629	14.27242 -1.10	0.275	-43.7454	12.4874
Computer, laptop	-10.0621	16.68046 -0.60	0.547	-42.9223	22.79813
Tablet	226.6924	52.11114 4.35	0	124.0344	329.3504
Smartphone	-22.7028	21.37135 -1.06	0.289	-64.804	19.39833
Split AC (winter/summer)	35.19181	23.88478 1.47	0.142	-11.8608	82.24438
Washing machine (Soviet-style)	-9.03897	17.02712 -0.53	0.596	-42.5821	24.50413

Household Expenditure per capita (θ=1)	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
Washing machine	48.98782	23.40748 2.09	0.037	2.875518	95.10013
Boiler for hot water	18.09595	30.89502 0.59	0.559	-42.7667	78.95857
Microwave oven	10.4486	22.83585 0.46	0.648	-34.5376	55.43481
Fridge	20.63494	18.02018 1.15	0.253	-14.8645	56.13437
Gas-stove	35.99219	35.49507 1.01	0.312	-33.9325	105.9168
Car up to 2000 year	18.44723	20.3375 0.91	0.365	-21.6173	58.51174
Car after the 2000 release	19.93525	16.17201 1.23	0.219	-11.9233	51.79381
Anything	-6.8215	85.70758 -0.08	0.937	-175.664	162.0209
_cons	100.501	154.0703 0.65	0.515	-203.015	404.0166

Note: Electricity is omitted because all household have access to electricity.

1 The use of full name is optional. First name only (or simply a participant number) may be used to preserve anonymity.
2 How many respondents of the focus group mentioned the source.
3 Where – 3 stands for to the most important source, 2 for quite important source, 1 - not so important source 0 – irrelevant.
4 How many respondents of the focus group mentioned the measure.
5 Where – 3 stands for to the most important measure, 2 for quite important measures, 1 - not so important measures, 0 – irrelevant.
6 The use of full name is optional. First name only (or simply a participant number) may be used to preserve anonymity.
7 How many respondents of the focus group mentioned the source.
8 Where – 3 stands for the most important, 2 for quite important, 1 - not so important 0 – irrelevant.


WORLD BANK GROUP
European Commission
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Departement of Economic Affairs, Education and Research EAER
State Secretariat for Economic Affairs SECO
UKaid
from the British people
USAID
FROM THE AMERICAN PEOPLE
CAEWDP
Central Asia Energy-Water Development Program