

# Situation of Water Supply and Sanitation in 26 villages in Moldova - Results of a Household Survey

Skat Consulting Ltd., Water and Sanitation Project (ApaSan) Moldova, 26.05.2016

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## 1 Background

The Water and Sanitation Project in Moldova (ApaSan) is a cooperation project of the Swiss Agency for Development and Cooperation (SDC), the Austrian Development Cooperation (ADC), the Ministry of Environment and the Ministry of Construction and Regional Development of the Republic of Moldova. The project is implemented by Skat Consulting Ltd. and has the goal of improving the quality of life of the rural population and public health in Moldova by increasing sustainable access to safe drinking water and environmental sanitation. Since 2001, the support has led to the construction of piped water supply systems in 26 villages and the establishment of community based operators. The project also aims at improving sanitation in villages, but has focussed on school sanitation mainly in the past.

As there is a lack of detailed and consistent data available from national level institutions in Moldova, ApaSan has commissioned a dedicated household survey in 26 villages in order to provide solid data for shaping the future support of the project. The survey had following objectives in particular:

- Understand the perspective of the villagers regarding the quality of water supply service received and the performance of the operator, in order to improve the project's support to operators
- Understand the current situation of sanitation for defining the project's strategy to support improvements in sanitation

The results of the survey may be of interest beyond the ApaSan project, and therefore this article is making them available to the wider water and sanitation sector in Moldova.

## 2 Methodology

The survey was conducted in 2014 in the 26 villages that have been supported in the past by ApaSan for the construction of piped water supply systems and the establishment of community based operators (Water Consumer Associations).

Data was collected by interviewing household heads or other household members present at the date of interviews. 1,037 households have been interviewed out of the ca. 13,500 households in the 26 villages. About 40 households were interviewed in each village. Within the villages, the households were selected randomly. The results have a margin of error of  $\pm 3.1\%$  at 95 % confidence. The interviews were conducted as face-to-face interviews following a defined questionnaire and complemented by observations from visiting the toilets and wastewater collection facilities by the interviewers. The interviewers also took photographs of the toilets and wastewater collection facilities<sup>1</sup>.

The Centre for Sociological Research and Marketing "CBS-AXA" was contracted to conduct the survey. The questionnaire was jointly developed and field tested by ApaSan and CBS-AXA. The interviews, data processing and compilation of the report<sup>2</sup> were conducted by CBS-AXA. This article summarizes the collected data and key results.

The data collected is representative for the situation in the 26 villages. However, these villages are not representative in all aspects for all villages in

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<sup>1</sup> All photos of the sanitation facilities in interviewed households can be accessed with the following link:

<https://www.flickr.com/gp/130775119@N04/kd9bvr>

<sup>2</sup> CBS AXA, 2015. Household Survey on Water Supply and Sanitation in 26 Villages of Moldova, Results of Sociological Research, Report commissioned by the ApaSan project.

Moldova. They are specific regarding the following 2 aspects:

- All the surveyed villages are located in the central region of Moldova
- All villages have piped water supply systems that were designed to provide potable water to the entire village, unlike many other existing piped systems that often only provide “technical” water or only to parts of the village. The water systems in all villages were operated by community based organisation (Water Consumer Association), which received technical support and training by the ApaSan project.

#### *List of the surveyed villages*

| District  | Locality                                                                                                                              |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|
| Calarasi  | Căbăieşti                                                                                                                             |
| Hinesti   | Calmaţui, Cărpineni (Gagarin), Cărpineni (Tărlăchici), Dragusenii Noi, Horodca Noua, Miresti, Pascani, Pereni, Secareni Noi, Sipoteni |
| Ialoveni  | Horodca                                                                                                                               |
| Nisporeni | Bacseni, Balauresti, Bolduresti, Boltun, Ciorăstii, Ciuteşti, Cristeşti, Iurcenii, Nisporeni Ciurleasa, Zberoaia                      |
| Orhei     | Butuceni, Morovaia                                                                                                                    |
| Straseni  | Scoreni                                                                                                                               |
| Ungheni   | Buciumeni, Sculeni                                                                                                                    |

### **3 Key results and discussion**

#### **3.1 Situation of water supply and water use**

All villages that were surveyed have an operational piped water supply system. The systems are designed for allowing connection of all households in principle, and ApaSan had requested a minimum initial contribution and connection of 70-75 % of households.

From the surveyed households, it was found that 73 % are connected to this public water supply. 27 % of the surveyed households use other sources for their main water supply; mostly dug wells, but some also use boreholes. More than half of households without a connection to the public water system say they can't afford the connection. A smaller number say they don't need a connection because they have their own water source or can't be connected for technical reasons. In most cases, people fetch water from their wells with buckets. Some people have also equipped their well with a pump.

The households connected to the public water system usually still have access to their old wells. However, they mainly use water from the public system for all purposes, including for garden irrigation and animals.

People were also asked to estimate the water consumption of their households from the different water supply source. The overall average of the households' own estimation is 71 Litres per day and person (l/dp). Average estimated consumption in households with a piped water supply connection is 83 l/dp, of which 53 l/dp comes from the piped water supply systems. It is important to note that these consumption data are not based on measured consumption but on people's own estimations, and therefore can only be used as an approximate indication. Records of the Water Consumer Association on measured water consumption from the piped water supply system indicate that in reality, consumption from the tap is even lower than estimated here. This means that the water consumption in the villages is likely to be considerably below average of other European countries or urban areas in Moldova, and below the values given by current Moldovan construction standards.

In order to analyse the consumption patterns, people were asked how many water taps and facilities they connect to the piped water supply system or to their well by means of a pump. Only half of the houses actually have running water inside their houses, while a quarter has just a tap with running water in the yard and another quarter has no running water at all. Of those with running water inside the house, most have a tap with sink in kitchen or bathroom, but only few have installed a shower or a flush toilet. Of those with running water in-house, two third did the corresponding investments and works immediately after the connection to the water supply system.

The survey shows that the connection rate does not significantly increase after the initial connection rate at the day the system went into operation. An important proportion of the non-connected households declare that they face economic or technical obstacles to be connected. In order to increase connection rate and approach universal access, these obstacles need to be addressed.

It is surprising how few households make full use of the possibility of having running water by installing plumbing inside their house to up-grade their living standards, and how low the water consumption appears to be. This could be explained by high levels of poverty in the villages and the emigration of an important part for the younger and most enterprising age groups towards cities or abroad.

The results also indicate a low dynamism in the post-construction development of the water supply systems: most people connect to the water supply system once it is available and up-grade their houses immediately if they can. In the years after the water systems enters in operation, little changes in connection rates or increase in water consumption are observed.

#### **1) Water supply options found in rural areas in Moldova**

- Connection to the public piped water supply system, which in the surveyed villages was always designed to provide potable water and with metered connections to every plot (unlike in many other villages in Moldova, where piped water often is non-potable ("technical") water and distribution may be done with public tap stands or unmetered private connections)
- Dug well, private or public; water is lifted by buckets or with a pump
- Borehole with a pump

#### **2) Connection to the public water system**

|                                                                  |      |
|------------------------------------------------------------------|------|
| Households connected to the public piped water supply system     | 73 % |
| Households not connected to the public piped water supply system | 27 % |

#### **3) Why aren't you connected to the public water system at the moment (multiple answers possible)?**

|                                                                          |      |
|--------------------------------------------------------------------------|------|
| We would like to connect, but the connection fee is too expensive        | 44 % |
| We do not need water from the pipe, we have enough water                 | 21 % |
| We would like to connect, but the cost for water consumption is too high | 10 % |
| In this part of the village, there is no water supply system             | 6 %  |
| We are awaiting, our connection is in work                               | 3 %  |

#### **4) If you are connected to the piped water supply, what is the main water source that you are using for various purposes?**

|                      | Piped water | Dug well or other sources |
|----------------------|-------------|---------------------------|
| Drinking and cooking | 94 %        | 6 %                       |
| Personal hygiene     | 96 %        | 4 %                       |

|                                       |      |      |
|---------------------------------------|------|------|
| Washing dishes and cleaning the house | 95 % | 5 %  |
| Irrigation                            | 77 % | 23 % |
| Animals                               | 86 % | 14 % |

#### **5) How much water do you consume from the difference sources of water supply?**

|                                                                                                              | Litres per day and person |
|--------------------------------------------------------------------------------------------------------------|---------------------------|
| Average estimated consumption of all interviewed households                                                  | 77                        |
| Average estimated consumption of households with piped water supply connection                               | 83                        |
| Average estimated consumption of households with piped water supply connection, from piped water supply only | 53                        |
| Average estimated consumption of households without piped water supply connection                            | 61                        |

#### **6) Do you have a tap with running water from the water system or a pump in a well?**

|                                         |      |
|-----------------------------------------|------|
| No running water                        | 24 % |
| A tap only in the yard                  | 27 % |
| Water piping installed inside the house | 49 % |

#### **7) Which of the following equipment do you have connected to the water system or to a pump in the well (multiple answers)**

|                                                                  |      |
|------------------------------------------------------------------|------|
| One or more taps, with or without sink                           | 47 % |
| Washing machine                                                  | 29 % |
| Bath tub and/or shower cabin                                     | 23 % |
| Water at the toilet (for flushing the toilet and/or handwashing) | 11 % |

#### **8) If you have water piping installed inside the house, when did you do these connections?**

|                                                      |      |
|------------------------------------------------------|------|
| Before the connection to the water system            | 7 %  |
| Immediately after the connection to the water system | 67 % |
| A few years after connection to the water system     | 14 % |
| No answer, do not know                               | 12 % |

### **3.2 Perceptions of water quality, quality of water supply service and improvement of quality of life**

The interviewees have very positive opinions on the quality of their water. Asked for rating on a scale between 1 (worst) and 5 (best), the average ratings given for safety, taste and smell of piped water ranged between 4.5 and 4.7, and for well water between 4.3 and 4.6. People consider well water being only slightly less safe (rating of 4.3)

than piped water (4.5). There seems to be a low level of awareness for the risk of microbial contamination of well water.

Asked about water availability, about two third of the households state that they have enough water all year, while about a third reports temporary water shortages.

Water service interruptions in the piped water supply system were assessed more in detail by asking how often and for how long the water service had been interrupted in the last 12 months. 73 % of the households had interruptions less than once per month or none at all, and for 54 % the duration was less than two days. On the other hand, 26 % report of interruptions once per month or more often, and 39 % say the water supply was interrupted for 2 days or longer. This indicates unsatisfactory performance of the water supply system in some of the villages.

In all surveyed villages, the water supply systems were operated by Water Consumer Associations (WCA). The connected households are members of the WCA and can in principle take part in decision making of the association in the generally assembly. The households are also customers of the association to receive the water supply service. The day to day operations are run by employed WCA staff. The households were asked how satisfied they are with the work of the WCA regarding the possibility to participate in decision making and how transparent and accountable the WCA is in its work. The households were asked to rate these aspects on a scale from 1 (worst) to 5 (best) and the average ratings were between 3.7 and 3.8, meaning the work of the WCAs is rated average to good.

For the analysis of service quality and satisfaction with the WCA, it is important to note that these values do not represent the average situation in each of the surveyed villages but the overall average of all households. Differences between the villages in performance and quality of service are likely, but a higher sampling size would be needed to provide reliable data on these differences.

86 % of the households connected to the water supply system declare that their life has improved since they are connected.

|                                                                                                                                                                                           |                                                                                                                                                                                                       | <i>From piped water supply systems</i>            | <i>From wells and bore-holes</i>                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------|
| <b>9)</b>                                                                                                                                                                                 | <b><i>What is the quality of the water that you drink?</i></b>                                                                                                                                        |                                                   |                                                       |
| Safety:                                                                                                                                                                                   | average of rating on a scale from 1 = unsafe to drink to 5 = safe to drink                                                                                                                            | 4.5                                               | 4.3                                                   |
| Taste:                                                                                                                                                                                    | average of rating on a scale from 1 = bad taste to 5 = good taste                                                                                                                                     | 4.7                                               | 4.4                                                   |
| Smell:                                                                                                                                                                                    | average of rating on a scale from 1 = bad smell to 5 = good smell                                                                                                                                     | 4.7                                               | 4.6                                                   |
| <b>10)</b>                                                                                                                                                                                | <b><i>Do you have enough water for your needs?</i></b>                                                                                                                                                | <i>Households connected to piped water supply</i> | <i>Households not connected to piped water supply</i> |
| Enough water all year long                                                                                                                                                                | 64 %                                                                                                                                                                                                  | 78 %                                              |                                                       |
| Water shortage in some years                                                                                                                                                              | 19 %                                                                                                                                                                                                  | 19 %                                              |                                                       |
| Water shortage every year for less than 1 month                                                                                                                                           | 7 %                                                                                                                                                                                                   | 1 %                                               |                                                       |
| Water shortage every year for more than 1 month                                                                                                                                           | 6 %                                                                                                                                                                                                   | 1 %                                               |                                                       |
| No answer, do not know                                                                                                                                                                    | 4 %                                                                                                                                                                                                   | 1 %                                               |                                                       |
| <b>11)</b>                                                                                                                                                                                | <b><i>How often in the last 12 months the water supply service was interrupted</i></b>                                                                                                                |                                                   |                                                       |
| No interruptions in the last 12 months                                                                                                                                                    | 45 %                                                                                                                                                                                                  |                                                   |                                                       |
| Interruptions less than once per month                                                                                                                                                    | 28 %                                                                                                                                                                                                  |                                                   |                                                       |
| Interruptions once per month                                                                                                                                                              | 4 %                                                                                                                                                                                                   |                                                   |                                                       |
| Interruptions more often than once per month                                                                                                                                              | 22 %                                                                                                                                                                                                  |                                                   |                                                       |
| No answer, do not know                                                                                                                                                                    | 1 %                                                                                                                                                                                                   |                                                   |                                                       |
| <b>12)</b>                                                                                                                                                                                | <b><i>In average, for how long was the water supply interrupted in the last 12 months?</i></b>                                                                                                        |                                                   |                                                       |
| Less than one day                                                                                                                                                                         | 31 %                                                                                                                                                                                                  |                                                   |                                                       |
| For one day                                                                                                                                                                               | 23 %                                                                                                                                                                                                  |                                                   |                                                       |
| From 2 to 7 days                                                                                                                                                                          | 24 %                                                                                                                                                                                                  |                                                   |                                                       |
| More than 7 days                                                                                                                                                                          | 15 %                                                                                                                                                                                                  |                                                   |                                                       |
| Just for the winter period                                                                                                                                                                | 1 %                                                                                                                                                                                                   |                                                   |                                                       |
| No answer, do not know                                                                                                                                                                    | 6 %                                                                                                                                                                                                   |                                                   |                                                       |
| <b>13)</b>                                                                                                                                                                                | <b><i>How do you rate the work of the Water Consumer Association regarding participation in decision making, transparency and accountability (on a scale from 1 = very bad to 5 = very good)?</i></b> | <i>Average rating</i>                             |                                                       |
| <b>Participation in decision making:</b> people like you can influence the activities of the WCA, have opportunities for participation (e.g. in participation to annual general assembly) | 3.7                                                                                                                                                                                                   |                                                   |                                                       |
| <b>Accountability:</b> all complaints that you might have are heard and resolved                                                                                                          | 3.8                                                                                                                                                                                                   |                                                   |                                                       |

**Transparency:** the WCA is informing you about its activities, budget, financial status, tariff system, quality of water, and all information is accessible

3.7

**14) Do you think your quality of life improved since you are connected to the water supply system?**

|                        |         |
|------------------------|---------|
| Improved               | 56 %    |
| Improved a little      | 30 %    |
| Stayed the same        | 8 %     |
| Got worse a little     | < 0.5 % |
| Got worse              | < 0.5 % |
| No answer, do not know | 6 %     |

### 3.3 Sanitation situation

The large majority of the households rely on pit latrines in their backyards: 87 % of the households exclusively use latrines. Another 2 % have ventilated pit latrines (VIP latrines) and very few households use urine diverting dry toilets (ecosan). 10 % of the households have flush toilets, but among these, only 1 % use flush toilets exclusively. The other 9 % owners of flush toilets continue to use pit latrines in parallel, and most of them actually use the latrines more often than the flush toilets.

The technical state and the cleanliness of toilets is extremely variable, especially among the most widespread type, the pit latrines. Therefore the survey has also assessed the cleanliness and the technical state of the toilets by rating them from very good (clean, all parts intact and well maintained) to very bad (dirty, floor broken, door broken or lacking). About 50 % of the pit latrines and VIP latrines were found to be in bad to very bad state. The ecosan toilets were found in good state and the flush toilets were not assessed as they are generally located indoors and assumed to be in good state.

Hygiene practices were assessed by checking if water and soap is available for washing hands after toilet use. Only in 21 % of the households, water and soap was easily available near the toilets, while in 40 % it was not available at all.

This data shows that the large majority of households in the surveyed villages live with very basic sanitation systems. At least half of the households live under conditions that cannot be considered as acceptable for protection of public health. Basic personal hygiene practices such as hand washing after toilet use are not sufficiently observed. The

widespread presence of unclean toilets combined with a lack of hygiene practices are likely to presents risks to public health by favouring the spreading of waterborne diseases.

**15) Types of toilets are found in rural areas in Moldova**

- Flush toilets of WC type: toilets made from a ceramic bowl and flushed from a cistern, connected to piped water supply; usually integrated in the house
- Pour flush toilets: toilets made from a ceramic bowl and flushed with a bucket; usually integrated in the house
- Pit latrines: a dug pit, covered by a slab made from wood or cement and a superstructure (cabin) from wood, bricks or other materials; either a hole in the slab or some self-built toilet seat or bench; the latrine is always located in some distance to the house.
- VIP or “ventilated improved pit” latrines: these are pit latrines with ventilation of the pit, which allows reducing smell inside the cabin. Flies are also controlled, if the top end of the vent pipe is covered by mesh to trap flies.
- Urine diverting dry toilets (ecosan) toilets: toilets that collect urine and faecal material separately. Faecal material is collected in a chamber and is dried, urine is collected in a container and stored for some time before it can be used as fertilizer. Ecosan toilets do not pollute the groundwater and are more close to the user comfort of a flush toilet. They are often built separately but can also be attached to the house or integrated into the house. Ecosan toilets have been introduced to Moldova in recent years by NGOs and the ApaSan project.

**16) What type of toilet does your household have?**

|                                                |         |
|------------------------------------------------|---------|
| Flush toilet (WC or pour flush)                | 1 %     |
| Two toilets: flush toilets and pit/VIP latrine | 9 %     |
| Pit latrine                                    | 87 %    |
| VIP latrine                                    | 2 %     |
| Ecosan                                         | < 0.5 % |

**17) If you have two toilets, which one you use more often?**

|                                 |      |
|---------------------------------|------|
| Pit/VIP latrine                 | 71 % |
| Flush toilet (WC or pour flush) | 29 % |

**18) Interviewers' rating of the technical state and the level of cleanliness of the toilets**

|                                                        |       |      |
|--------------------------------------------------------|-------|------|
| Pit latrines and VIP: cleanliness                      | 50 %  | 50 % |
| Pit latrines and VIP: technical state                  | 53 %  | 47 % |
| Ecosan toilets: cleanliness and technical state        | 100 % | 0 %  |
| Flush toilets were not assessed but assumed to be good |       |      |

**19) Distance of latrines to well**

|                                                                                                                                  |      |
|----------------------------------------------------------------------------------------------------------------------------------|------|
| Latrines found to be located closer than 20 m to the nearest well, which is clearly threatening the quality of water in the well | 15 % |
|----------------------------------------------------------------------------------------------------------------------------------|------|

**20) Is there water and soap for handwashing hands after using the toilet? (Observations by the interviewers)**

|                                                                               |      |
|-------------------------------------------------------------------------------|------|
| Water and soap are easily available                                           | 21 % |
| Usually both water and soap are available but today they are not              | 7 %  |
| Water and soap are available, but difficult to use (e.g. too far from toilet) | 32 % |
| Neither soap nor water are available                                          | 40 % |

### **3.4 Situation of wastewater disposal**

Wastewater from the surveyed households in the villages comes mainly from the small percentage of flush toilets present and from use of water in kitchen and bathing. Only 1 % of the households are connected to a public sewer system. 25 % discharge their wastewater into a dedicated structure on their plot. These structures are either similar to soak pits that infiltrate wastewater into the underground, cess pools that collect wastewater to be evacuated by a vacuum truck or septic tanks that pre-treat wastewater before it infiltrates into the underground. Another 10 % discharge their wastewater via a pipe on their plots or nearby. However, 64 % of the households have no piping for wastewater and collect wastewater in buckets to pour it in the garden.

Infiltration of wastewater from septic tanks, soak pits, cess pools, but also from the widespread latrines, has to be considered as a source of pollution of groundwater in shallow aquifers. This results in contamination of well water with pathogenic germs. The wider ecosystems are likely to be less affected as the impact of groundwater pollution from wastewater infiltration and latrines is mostly local and limited in scale. Nitrate pollution of groundwater from domestic wastewater and latrines might locally be an issue, but on a wider scale is likely to be negligible compared to agricultural pollution.

On the other hand, there is very little superficial discharge of wastewater in the surroundings of the village or into surface water bodies. Two third of the population do not even have plumbing for collecting wastewater, only 35 % of the households have some type of wastewater pipe leaving the house. The low rate of in-house plumbing for water supply and the low average consumption of water discussed in previous chapters are coherent with these findings. It appears therefore that under the present conditions found in the surveyed

villages, there are no urgent problems with wastewater discharge that would indicate a high priority for investing in wastewater collection infrastructure.

**21) Options for disposal of wastewater used in rural areas in Moldova**

- Connection to a public sewer system
- Connection to facility located on the site of the plot. The most common facilities are called soak pit, septic tank or cess pit. However, most facilities found in villages are not constructed following good technical standards and are usually just somewhat similar in shape and function to one of the following technologies:
  - A soak pit is an underground tank with unsealed bottom, so that the water can infiltrate into the underground
  - A cess pit is a sealed underground tank, collecting wastewater. Once the tank is full (once in 1-2 months) it needs to be emptied by a vacuum truck or other equipment.
  - A septic tank is an underground tank, which is fully sealed and has a baffle separating the tank in two chambers. The tank acts as pre-treatment for wastewater, by trapping solids in wastewater in the first chamber, where they are partly digested and accumulated as sludge. The sludge needs to be emptied every 2-5 years. The liquid part leaves the tank via a pipe, which is generally either connected to a soak pit or to a sewer system.
- Disposing wastewater via a pipe to the garden, a pit in the garden, or to the street ditch.
- Disposing wastewater by carrying it in buckets to the garden, pits or a ditch.

**22) Where does residual water from kitchen, bathroom and washing clothes go?**

|                                                  |      |
|--------------------------------------------------|------|
| Public sewer system                              | 1 %  |
| Soak pit, septic tanks, cess pools               | 25 % |
| Garden, street, pits (through pipes)             | 10 % |
| Garden, street, pits (directly by buckets, etc.) | 64 % |

### **3.5 Perceptions regarding sanitation**

People were asked to rate their own toilets on a scale from 1 (very bad) to 5 (very good) regarding how good it protects their health, how good it protects the environment, how comfortable it is to use and how easy it is to clean. The average ratings were similarly in the range from 2.9 to 3.7 (average to good) for all four criteria. Interestingly, people rated pit latrines not much lower (2.9-3.1) than flush toilets (3.6-3.7).

The households are responsible themselves to maintain their toilets or the wastewater disposal facilities on their plots. Maintenance is usually

necessary when the pits of the latrines are full, when cess pools are full with wastewater, or soak pits and septic tanks have accumulated too much sludge. Latrines are mostly not emptied but a new latrine is built in another spot. 61 % of the septic tanks, cess pits and soak pits are emptied by vacuum trucks, 23 % are emptied manually, and 15 % of the interviewed people had no clear idea what to do when these facilities are full.

Only a small proportion of the owners of a soak pit, cess pool or septic tank reported having problems with maintenance, smell or clogging.

About a third of the households declare that they have plans to build a better toilet in the next 3 years, another third would wish to do so but hesitate because of the needed investment or other difficulties, the last third say they don't plan any improvement because their toilet is good enough. On the other hand, 54 % say they would be ready to pay for a connection to a sewer system and 46 % say they would pay for a better and more comfortable toilet. The question on willingness to pay for sanitation options did not specify costs, so the answers give mainly an indication of the respondent's priorities.

As it has been discussed in the previous chapters, the large majority of the households have very basic sanitation facilities that cannot be considered as satisfactory from the perspective of public health. However, people themselves generally do not seem to consider their situation that bad. For example, one third of the respondents do not even express the wish to improve their toilet and are content with what they have. Another example is that flush toilets are not considered very much superior to pit latrines, and if present, they are not preferred to the pit latrines.

An important finding is also that there is a lack of knowledge and awareness on sanitation options other than latrines and sewerage. Alternative toilet or wastewater disposal options such as ecosan toilets or septic tanks are not widely known. Similarly, the maintenance practices for facilities for on-site wastewater disposal such as septic tanks or soak pits indicate that their correct functioning is not always well understood.

It is interesting to note that more than half of the respondents express their willingness to pay for a sewer connection, while much less of the house-

holds have a current need for such a connection: only 35 % of the households actually have a wastewater discharge pipe that could be connected to a sewer and only 10 % have flush toilets. An explanation for this discrepancy could be that people wish to up-grade their house with better bathrooms and toilets, and that public sewerage is the only or main wastewater disposal option known or considered by them. Alternative options for individual sanitation, such as septic tanks that would allow a similar up-grading, are less known.

**23) Please describe what options of toilet you know (multiple answers possible)?**

|                |      |
|----------------|------|
| Pit latrines   | 93 % |
| Flush toilets  | 73 % |
| VIP latrines   | 51 % |
| Ecosan toilets | 22 % |

**24) How would you rate your toilet from the point of view ...**      **Flush toilet**      **Pit latrine**

(Average rating from 1= very bad, 2 = bad, 3 = average, 4 = good, 5, very good)

|                          |     |     |
|--------------------------|-----|-----|
| Protects health          | 3.7 | 3.1 |
| Protects the environment | 3.6 | 3.1 |
| Comfortable to use       | 3.7 | 2.9 |
| Easy to clean            | 3.7 | 2.9 |

**25) Please describe what options of wastewater collection and storage do you know?**

|              |      |
|--------------|------|
| Sewerage     | 82 % |
| Soak pits    | 61 % |
| Cess pits    | 56 % |
| Septic tanks | 29 % |

**26) Do you have any problems related to the maintenance of septic tank, soak pit or cess pit (multiple answers possible)?**

|                                                            |      |
|------------------------------------------------------------|------|
| There are no problems                                      | 76 % |
| We have to empty it often, and this procedure is expensive | 10 % |
| There is bad smell                                         | 8 %  |
| Wastewater is leaking                                      | 6 %  |
| It is often clogged                                        | 3 %  |

**27) What do you do when pit latrine, VIP latrine, septic tank, cesspit, soak pit is full?**      **Septic tank, cess pit or soak pit**      **Pit and VIP latrine**

|                                     |      |      |
|-------------------------------------|------|------|
| We dig a new pit / build a new tank | 1 %  | 81 % |
| We empty it with a vacuum truck     | 61 % | 5 %  |
| We clean it manually                | 23 % | 2 %  |
| Other, do not know                  | 15 % | 12 % |

**28) In the next 3 years do you have plans to build a better toilet to replace the existing one?**

|                                               |      |
|-----------------------------------------------|------|
| Yes, I will build a better toilet             | 35 % |
| I wish, but it is too expensive and difficult | 30 % |
| No, my toilet is pretty good                  | 29 % |

**29) Would you agree to pay for the constructing of the following option?**

|                                    |      |
|------------------------------------|------|
| Connection to the sewer system     | 54 % |
| Better and more comfortable toilet | 46 % |
| Flush toilet                       | 39 % |
| Septic tank or cess pool           | 25 % |
| Ecosan toilet                      | 14 % |

## 4 Conclusions

This chapter summarizes the main conclusions of the study.

Quality of the water supply service:

- The public water supply systems in the 26 villages are all operational, and all households connected to the water system are using the piped water as their main source for drinking water supply. The new water supply systems have contributed to an improvement of the quality of life of the people in the villages.
- There are still a number of people in the villages who would like to be connected but face economic or technical obstacles to do so. Addressing the particular situation of these households will be important when providing support to rural water supply in order to ensure universal access.
- Water consumption remains very low even after the provision of a good water supply system. People generally only do modest upgrading of the piping in their houses.

Performance of the Operator (Water Consumer Associations):

- Overall the Water Consumer Associations in the villages perform well, provide mostly reliable water services and the people are generally satisfied with their work. However, the level of performance may differ from WCA to WCA. The most efficient way of improving the overall quality of the water supply service would be to identify the low performers and to address their specific problems.

Sanitation and hygiene:

- The sanitation and hygiene situation in the surveyed villages is unsatisfactory from the perspective of public health. The large majority of households in rural Moldova use very basic latrines, many of them in bad to very bad constructive, aesthetic and hygienic conditions. Basic personal hygiene practices such as hand washing after toilet use are not sufficiently observed.
- The widespread use of latrines and infiltration of wastewater on the plot are expected to impact the groundwater in the immediate surrounding and are likely to affect the water quality in wells. People in the villages seem not to be fully aware of this risk.
- Wastewater discharge from the surveyed household does not presently constitute a major problem. Despite the availability of piped water, people consume only small volumes of water and thus discharge small volumes of wastewater only.
- Village wide sewer systems are currently unlikely to be a viable solution for several reasons:
  - sewer systems do not solve the most important sanitation problem in the villages
  - the state of toilets in households (65 % of the households presently cannot be connected to a sewer system because they have no in-house piping for wastewater)
  - a sewer system for the whole village but with only a small number of households connected would be technically and financially difficult to operate.
- Awareness for health risks from unsafe drinking water or insufficient personal hygiene is low. The knowledge about alternative sanitation options, such as ecosan toilets or properly operated septic tanks is also low. Any initiative aiming at improvement of the sanitation and hygiene situation in rural areas needs to improve information and awareness of the population.
- The sanitation situation in other villages in Moldova, where the average water supply situation is much less favourable compared to the surveyed villages, is expected to be similar or even more pronounced: even more reliance on pit latrines and even less discharge of wastewater is likely.