

Guidebook

for the implementation of decentralised
water supply systems in Moldova



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ApaSan, Swiss Water and Sanitation Project in Moldova

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Definitions and Acronyms

ADA	Austrian Development Agency
ApaSan	Swiss Water and Sanitation Project in Moldova
Decentralised water supply systems	Piped water supply systems for rural villages that have their own water source, independent of larger urban or regional water systems
LPA	Local Public Administration: Administrations on <i>Raion</i> level (LPA I) or Municipal level (LPAII). LPAII is also called Mayorality (Primaria)
SDC	Swiss Agency for Development and Cooperation
WCA	Water Consumer Association, a non-profit organisation formed by water consumers whose aim is to manage, operate and maintain a decentralised water supply system. In Romanian: Asociația Consumatorilor de Apă (ACA)
GA	General Assembly of a Water Consumer Association, uniting all members for decision making. In Romanian: Adunarea generală ACA
Leu / Lei	Moldovan Leu (pl. Lei); 1 Euro = 19 Lei (July 2014)

Introduction

What is the guidebook about?

In 10 years of successful cooperation between Switzerland and Moldova, rural communities in Moldova have been supported with the construction of decentralised water supply systems.

These new water supply systems use springs located close to the villages and distribute the water through a pipe network to the households of the community. The systems are managed by community based organisations, the Water Consumer Associations (WCA). Such decentralised and community managed water supply systems have proven to be very successful in providing sustainable water supply for rural communities. This approach therefore merits wider application throughout rural Moldova.

The aim of the guidebook is to make this experience available, with the hope that it is used to implement more systems that provide better and lasting water supply services for the rural population in Moldova.

By whom and for what the guidebook can be used?

The guidebook is primarily written for professionals and institutions in Moldova who implement water supply projects in rural Moldova:

- Local Public Administrations (LPA) and National Investment Funds can use the book for planning investments into water supply infrastructure, improving sustainability of their investments, and advising communities to set-up organisational structures.
- Communities can use the book as guidance to setting up Water Consumer Associations (WCAs), preparing proposals to receive funding for improving water supply systems, and to manage their water supply systems.
- Donor or NGO funded project implementation units and consultants can use the book as guidance throughout the project cycle of implementing investments into rural water supply infrastructure and supporting LPAs and communities in managing and operating the systems

The guidebook also provides information valuable to central government agencies, donors, universities and larger water supply operators.

What is the scope and status of the guidebook?

The present version of **the guidebook covers water supply systems that have springs as a water source and that are managed by the community via a Water Consumer Association**. The guidebook can therefore be used for situations where spring water is available, which is mainly in the central region of Moldova, and where communities and local administrations are willing to choose community based management. Selected parts of the guidebook may also be useful for other situations, e.g. where only well water or river water is available or where no interest for community management exists.

The guidebook describes the water supply model as developed, applied and recommended by ApaSan and the implementation approach as it is currently used by Apasan. Professionals and institutions in Moldova using the content of the guidebook may not always be able to directly apply the information but need to adapt it according to their own situation and needs.

The present guidebook is in its first version. It will be revised and updated periodically to further improve the book and expand its scope. The next version is planned for 2014/2015 and will also include experience with systems using treated surface water and water from deep wells, with systems covering several villages and with systems with different management forms.

How to use the guidebook?

Part 1 of the guidebook gives a **detailed description of the decentralised water supply systems** based on spring water catchments and managed by the community and how they work.

Part 2 gives **detailed guidance for the implementation** of this type of decentralised water supply and on how to support the different project stakeholders.

Part 3 gives **detailed templates, examples and other documents that can be useful for the implementation** of decentralised water supply systems. The text of part 1 and part 2 refers to documents that are useful when conducting the different implementation steps.

The use of all parts of the document and the annexes, their distribution, their adaption and further improvement for the application in other projects is permitted and encouraged. Feedback about use or modification of the document and suggestions for improvements are welcome (info@apasan.md).

Background

Access to reliable and safe drinking water and to adequate sanitation facilities is still far from being a reality for many people in rural Moldovan communities. According to estimates of the WHO/UNICEF Joint Monitoring Programme, in 2011, only 23% of the population had access to piped water supply. Private or communal draw wells are the only water source for most of the rural population. This implies major negative impacts on the life quality and health situation of the Moldovan population.

Initiated in 2001 as a humanitarian aid intervention after the acute drought of the year 2000, the Swiss Agency for Development Cooperation (SDC) supports Moldovan rural communities with the implementation of rural water supply systems. Today, SDC together with the Austrian Development Agency (ADA) funds a project named ApaSan that is run by a multidisciplinary team consisting of Moldovan and Swiss specialists from Skat Consulting Ltd. With this support, about 40,000 people in 24 villages have been supplied with piped water at the date of printing, and projects are ongoing in another 7 villages (see Table 1).

The original strategy of the project is to use local springs located close to municipalities and distribute the water through, ideally, a gravity driven supply network. This system is managed by a Water Consumer Association (WCA) formed by a majority of members of a rural community. The advantages of this approach are manifold. Despite that the discharges of these springs often are rather small, they are frequently able to satisfy the water needs of the population for consumption and hygiene. The water sources usually comply with WHO quality standards without further treatment. The resulting absence of sophisticated treatment technologies (except chlorination) should therefore allow the communities to maintain such systems in a long run without further financial and technical support. The involvement of the community during construction of the water supply system and in the operation of the WCA furthermore creates ownership, following the principle of: *"what is done by your hand is more worthy and your pursue it to be preserved"*. A WCA member of the village of Iurceni said: *"When you work with your sweat, then you know the price of your work and if you see someone damaging it, you stop him"*.

The aforementioned factors all contribute to the sustainability of the ApaSan approach and make it suitable for being implemented in many locations in Moldova, wherever the surrounding conditions are favourable. The present guidebook supports the scaling-up of the ApaSan approach by making the comprehensive experience of ApaSan available to people or institutions in Moldova that are working for sustainable water supply in Moldova's rural areas.

Table 1: List of water supply systems and WCAs established with ApaSan / SDC support

Raion	Location	WCA name	People connected	Year
Anenii Noi	Șerpeni	Apă Șerpeni	3,100	(2014)
Călărași	Căbăiești	Căbăiești	1,100	(2014)
Hîncești	Horodoca mica	Botna	1,000	2007
Hîncești	Călmățui	Suhat	1,400	2007
Hîncești	Cărpineni (Gagarin)	Gagarin	2,100	2006
Hîncești	Cărpineni (Tirlichici / Cot)	Gagarin	2,300	2013
Hîncești	Drăgușenii Noi	Botna	1,800	2007
Hîncești	Mirești	Uluce	1,060	2008
Hîncești	Pereni	Șipot, Pereni	940	2003
Hîncești	Secăreni Noi	Izvoarașul	350	2007
Hîncești	Șipoteni	Șipot, Șipoteni	500	2005
Ialoveni	Horodca	Izvorul Vlasi	1,000	2010
Nisporeni	Bacșeni	Apă Cristalină	360	2006
Nisporeni	Bălăurești	Apă cristalină	3,780	2004
Nisporeni	Boldurești	Maxim Cernatu	1,800	2004
Nisporeni	Bolțun	Izvoare	1,000	2013
Nisporeni	Ciorești	Roua Codrului	3,000	2009
Nisporeni	Ciutești	Mocanu Sfântu	1,500	2009
Nisporeni	Cristești	Izvoare	1,500	2004
Nisporeni	Iurcenii	Căzănești	2,000	2008
Nisporeni	Milești	Milești	2,200	(2014)
Nisporeni	Nisporeni	Ciurleasa	500	2004
Nisporeni	Pașcani	Galbenul	1,820	2005
Nisporeni	Vulcănești	Roua Codrului	1,200	(2014)
Nisporeni	Zberoaia	Izvoaraș, Nisporeni	2,100	2004
Orhei	Butuceni + Morovaia	Orheiul Vechi	300	(2014)
Orhei	Trebujeni	Orheiul Vechi	1,300	(2014)
Strășeni	Scoreni	Aqua Nostra	800	2007
Strășeni	Micleușeni + Huzun	Micleușeni	2,200	(2014)
Ungheni	Buciumeni	Izvoaraș, Ungheni	1,100	2010
Ungheni	Sculeni	Aqua Sculeni	1,700	2010

(2014) – expected completion

What is a decentralised and community managed water supply system?

1.1 Technical characteristics of decentralised water supply systems

A typical water supply scheme in the ApaSan project comprises the following components:

- One or several water sources, typically spring catchments
- Pumping station, if needed
- Reservoirs, if needed; usually underground tanks or water towers
- Pipelines, distribution network, one or several pressure zones depending on topography
- House connections

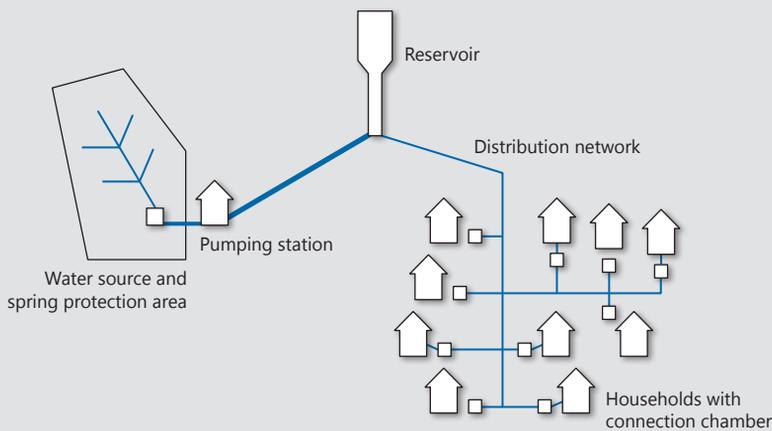


Figure 1: Sketch of a typical decentralised water supply system

Due to the geological nature of the region, most springs caught in the ApaSan project are gravity springs, where the water flows on a natural underground slope to the surface. To catch the water, it is drained towards a collection chamber from where it flows by gravity or is pumped to a reservoir. The catchment area is fenced to protect the area from farming or domestic animal grazing and to prevent establishment of potential sources of groundwater contamination such as waste dumps, informal settlements or stables. The reservoir locations are ideally selected in a way that it can supply the consumers by gravity. The reservoirs can be either buried underground metal tanks (e.g. former wine storage tanks) or water towers.

The water is distributed to the households through a network of polyethylene (PE) pipes with isolation valves in defined locations, which allows routine maintenance or emergency repairs to be done to parts of the system without shutting off the whole supply. The connection chambers, which contain the individual consumer's water meters, represent the boundaries of the public water supply network. The households use water directly from a tap at the connection chamber or they install plumbing inside the house at their own costs.

The water supply systems are designed for a per capita consumption of approximately 50 litres per day (see also Box 1). The main consumers are households, schools and the administrative buildings. Industrial, agricultural or other consumers are less common.

Box 1: How much water is really consumed in Moldovan villages?

Domestic consumption

The Moldovan standards stipulate that water systems in cities and villages need to be designed assuming a per capita water consumption of 120 litres of water per day. The average consumption per person in most European countries is in a similar range.

However, the experience of ApaSan has shown that in Moldovan villages, water consumption remains very low even after the provision of good piped water supply connections to each household: the average consumption in 22 water systems constructed with support of ApaSan is about **25-30 litres per capita and day**.

The explanation for this low consumption is that many, or even most, people do not install plumbing inside the house and thus do not connect water consuming equipment such as kitchen sinks, showers, or washing machines; also many people continue to use well water for non-potable use or in winter when they sometimes completely shut off their tap water connection. A reason for this behaviour is most likely the limited cash resources in villages, where people try to minimise consumption of water that needs to be paid for. Another factor may be that most of the rural population comprises old people who tend to be content with old habits and strive less for modernisation and upgrading equipment in houses.

It is important to take into account realistic consumption values when building decentralised water systems in Moldovan villages, as neglecting this may lead to over-dimensioned and expensive systems and to over-estimate revenues from water tariffs. Therefore, decentralised water systems built with support of ApaSan are usually based on the assumption of a per capita consumption of 50 l/day.

Garden irrigation

Many rural households do irrigate their gardens. The demand for irrigation water can be particularly high during the dry summer time, which coincides with the time when

springs have the lowest yield. If water from decentralised piped water systems is used for irrigation, this can put high stress on the capacity of the systems and cause water shortage. For this reason, decentralised water systems built with support of ApaSan are not designed to supply water for irrigation. Consumption of water for irrigation is often discouraged by special tariffs (see also Table 2).

1.2 The Water Consumer Association Model

In the water supply model implemented by ApaSan, management, operation and maintenance of the whole system is in the hand of the Water Consumers Association (WCA, in Romanian: Asociația Consumatorilor de Apă, ACA). The infrastructure is owned by the local Mayoralty, which provides a concession to the WCA for the operation of the system.

The WCA is led by a management board which consists of a minimum of five members and meets at least four times a year to discuss current issues such as tariff alignments or upcoming repairs and to plan actions needed for maintaining a smooth operation of the water supply system.

Even though the WCA board has the operational lead, main decisions such as the approval of the annual budget or the admission and exclusion of members are made by the general assembly, consisting of all WCA members. The WCA members are the water consumers, i.e. all members of the community connected to the water system.

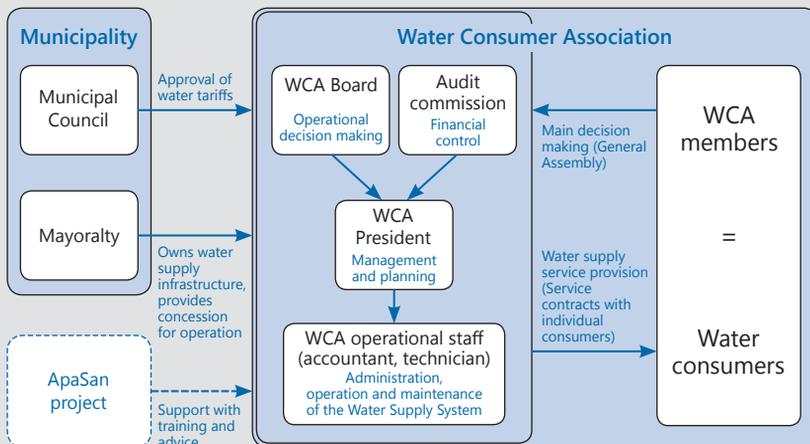


Figure 2: Organisational structure and responsibilities of the Water Consumer Association

The operations of the WCA are led by the WCA president and run by its staff. The sole task of the WCA is to administrate, operate and maintain the water supply system for providing water supply services to its members. Service provision is regulated by service contracts between the WCA and the consumers.

Management through water consumers associations is a new management modal in the Republic of Moldova. It is aimed at placing consumers in the centre of concern of water supply services. Water Consumer Associations (WCA) have the legal form of "Public Associations", which fall under the category of privately owned legal entities with non-profit purpose¹.

When applying the WCA model, the following points are important to comply with existing legislation:

- All movable and immovable property for ensuring the provision of water supply and sanitation are part of the public property of the administrative territorial unit (Primaria).
- Establishing a concession contract between the local public authority and the water consumers association is mandatory.

The following legally binding documents regulate the functioning and obligations of a WCA:

- The **statutes of the WCA**² define the WCA's constitution, describing the purpose of the association, the responsibilities of the members of the WCA executive committee and the means by which the WCA members exert control over the committee.
- The **rules of procedures**³ within WCA, among others stipulating the rules for the organisation and labour discipline within the WCA in compliance with the provisions of the Labour Code and Moldovan laws.
- The **concession contract**⁴ grants the right of the WCA to provide the public service of water supply to its community at the costs approved by the LPA. It is also determined that the infrastructure remain the assets of the LPA. The concession is granted for a defined period (usually not less than 10 years, sometimes up to 50 years).

¹ Annex: Law Nr. 837 on public associations

² Annex: Example of statutes of a WCA

³ Annex: Example of internal regulations of procedures in a WCA

⁴ Annex: Example of a concession contract between a LPA and a WCA

- The **regulation on the organisation and operation of public water services**¹ regulates the obligations of the WCA towards the provision of the services assigned by the local administration (e.g., continuity of service in terms of quality and quantity, non-discriminatory access)
- The **service delivery contracts**² between the WCA and each individual consumer.

Box 2: Management models for Rural Water Supply Systems

Other management models also exist in Moldova:

- **ApaCanal of the *Raion* capital:** The ApaCanals are public enterprises that manage the urban water and wastewater systems of the *Raion* capital towns. They are owned by the town and are not responsible for providing water services to other communes like the surrounding rural villages. They usually manage water systems in other communes only if their water system is physically part of the urban water system (e.g. village Rosu connected to the urban water supply system of Cahul). Recently, several ApaCanals in Moldova have attempted to become regional water operators, which means that they would also take over the management of existing decentralised water systems. One example of such a development is the Servicii Comunale Floresti that is already managing two village water supply systems with independent water sources (deep wells) far from the *Raion* capital.
- **Municipal unit or enterprise:** Some rural communes have their own unit or enterprise managing a local water supply system. This management model may have several disadvantages compared to the WCA model, such as unsatisfactory levels of accountability (income from water fees is often not directly and exclusively assigned to maintain the water service) and risks of political interference e.g. in tariff setting or nomination of staff.
- Other models may be possible in principle, such as concessions to **private operators, or inter-communal enterprises**, but little or no experience with such models exists to date in Moldova.

ApaSan's work so far focussed on **the WCA model**, which has proven to be very successful and is therefore recommended as management model for decentralised rural water systems. However, other management models may also be suitable under certain conditions. ApaSan will in future explore other models as well and future revised versions of this guidebook will include guidance on them, if appropriate.

¹ Annex: Regulation on the organisation and operation of public water services

² Annex: Example of a service delivery contract between WCA and water consumers

1.3 Bodies of the WCA

WCA members

The WCA members are the water consumers connected to the water system. They join the WCA during the process of the formation of the WCA or later. Upon joining the WCA they receive water supply services against payment of water fees based on established tariffs, as regulated in individual service contracts with the WCA.

At the same time the members are the main decision makers of the WCA, exercising this role in the WCA's general assembly.

WCA members thus have a dual role as decision makers and as water consumers.

WCA General Assembly (Adunarea generală ACA)

The **General Assembly (GA)** is the body comprising all the WCA members and it is the supreme ruling body of the WCA. The GA annual meeting¹ is also the forum where the members bring in their concerns and exercise their rights directly. The GA meeting is held annually and the items discussed and decided include the following:

- Presentation of the president's annual report²
- Presentation of the financial statement by the accountant
- Granting discharge to the president by the audit commission
- Presentation of the annual plan and budget

Additionally, following points may be covered:

- Proposals for tariff adjustments, such as increases, or different block tariffs or consumption limits. The tariffs proposed by the WCA need subsequently to be approved by the municipal council.
- Admission of new members and their connection to the water system
- Hiring staff
- Policy towards debtors
- The renewal or confirmation of the executive committee members, including the president (once in two years)
- Any problem or suggestion put forward by any WCA members

¹ Annex: Example of minutes of a general assembly meeting

² Annex: Example of annual report of the WCA president

The general assembly should meet at least once a year, special meetings can also be organised whenever there is a need to discuss specific and urgent issues, such as the need to select another member of the executive committee or because members of the audit commission see the necessity to intervene urgently. The president invites the members to the meeting at least 10 days in advance. The notice may be delivered by mail or by the technician/meter reader and is also posted on the information board in the WCA office. The annual meeting of the General Assembly is vital as it forces all parties involved to deal with their tasks and obligations (e.g. budget, annual planning, audit, tariff calculation, inventory of infrastructure). Gathering enough members to participate in a GA meeting is often a challenge, so sufficient effort in planning and mobilising members is important. Experience has shown that WCAs that do not conduct a General Assembly meeting on a regular base are more likely to perform badly and make financial losses.

WCA board (Consiliul ACA)

The WCA board is the management board or executive committee of the WCA and coordinates the work of the WCA between the General Assembly meetings. Usually the number of the WCA board members is related to the number of WCA members, the number of board members in ApaSan partner communities varies between five and eleven. The board members are elected by the general assembly. The board should have at least four meetings¹ per year to discuss the current activities of the WCA and make decisions related to the day-to-day operation of the system.

ApaSan strongly encourages a good representation of women in the WCA board in order to make sure that gender related issues are sufficiently considered in operational decisions of the WCA. A quota of women representatives in the WCA board may be fixed in the WCA statutes.

Audit commission (Comisia de cenzori)

The inspection of the WCAs financial activity lies in the hand of the audit commission, consisting of at least three members of the association, elected by the general assembly for a period of two years. Audit commission members cannot be members of the WCA board. The audit commission meets whenever necessary, but at least once per year.

¹ Annex: Example of minutes of a board meeting

The audit commission shall:

- be granted the right of inspection of files documenting the activities of the committee for a certain period of time
- supervise the legality of the WCA's activities
- conduct periodic and unannounced inspections of asset management activities
- participate in general assembly meetings where it presents the audit report¹

Permanent salaried staff

The WCA's salaried staff usually comprises the president, the accountant and the technician. The WCA can likely function with this set of people as a minimum but the employment of additional technicians or other staff might be needed, depending on the size or technical characteristics of the water supply system, the number of households served.

The president is a key person in the successful operation of the WCA.

The president performs the function of the executive manager or director. He or she needs to understand the technical and organisational structures of the water supply system and also needs to have an excellent reputation within the community. The president ensures that the decisions made by the general assembly and the WCA board are put into operation.

ApaSan's performance assessments of WCAs have shown that a capable, committed and motivated president was the single most important factor contributing to good performance of WCAs.

The **president**:

- is a member of the WCA board and presides it
- is a paid staff of the WCA
- is elected by the General Assembly a term of 2 years
- organises and directs the work of the Association
- represents the association in relations with businesses, individuals and other associations
- has the signature authorisation (e.g., work orders, contracts, material sourcing)
- appoints, advances and dismisses WCA's staff (with the approval of the general assembly)
- bears full liability for financial resources and material assets of the association.

¹ Annex: Example of annual report of the audit commission

The **accountant**¹ of the WCA:

- is responsible for the administration of the WCA budget
- is responsible for performing procurement and disbursement functions
- is responsible for the accounting of the resources of the WCA, including maintaining financial records, keeping an inventory², preparing the budget³ and regular financial reports⁴
- is responsible for billing, for issuing payment orders and for collecting payments from water consumers
- often also acts as secretary of the president and is responsible for the communication and outreach of the WCA to different stakeholders

The **technician**⁵ is responsible for the operations and maintenance of the water supply system, including the preparation of the operations and maintenance plan and budget. Furthermore, he or she is responsible for:

- the continued production and supply of water based on the standards defined in the regulation on the organisation and operation of public water services
- repairs and ensuring continued functioning of all parts of the water system
- projecting and planning future needs of the system based on customer growth and demand
- meter reading

1.4 Operation of the WCA

WCA Office

The WCA office is the contact point for all service related matters. The accountant is present during fixed hours so that customers can drop in to pay their water bill or if they want to find out about the status of the business. Every WCA office is committed to display the most relevant documents on their billboard⁶. To assure complete transparency throughout the operation of the WCA, members of the WCA and government officials should have the opportunity to inspect the

¹ Annex: Example of a job description of a WCA accountant

² Annex: Example of inventory list of WCA assets

³ Annex: Example of an annual WCA budget, Annex 033: Template for an annual WCA budget

⁴ Annex: Template of annual WCA financial report to authorities
Annex: Template of annual WCA financial report to members

⁵ Annex: Example of a job description of a WCA technician

⁶ Annex: Examples of billboards at WCA offices

documents¹ that state all the activities and decisions taken by the WCA board. Relevant documents (e.g., statutes, organisational chart, tariff structure) need to be displayed at the information board of the WCA office.

Planning

A formalised annual planning is an integral part of the WCA operational tasks.

The annual plan should comprise the following components:

- Administrative plan (e.g. scheduling of meetings of GA, board and audit commission, reporting dates etc.)
- Human resources plan
- Annual budget² and tariff revision (if needed)
- Operation, maintenance and monitoring plan³

In addition to annual planning, there is also the need for longer term planning, mainly for major expenditure needed for asset renewal. The plan for asset renewal should also be revised on an annual basis and updated if needed.

The annual plan needs to be presented to the general assembly and the WCA executive committee and is a good instrument for the president to justify expenditures and possible tariff adjustments. The planning process furthermore obliges WCA to analyse their performance and disclose areas that need action. An annual budget is also mandatory for the legal status of an association.

Accounting

The accounting methods used by the WCA are described in the WCA's own accounting policy⁴, which is a document every WCA is required to have by law. To keep administration concise and consistent, a template for defining an accounting policy according to the needs of the WCAs has been provided by ApaSan.

Bookkeeping is done usually by using the commercial software "1C" which was adapted to the requirements of the WCA. Training in either the use of "1C" or even the general use of computers has been offered by ApaSan. However, some WCAs do not use accounting software and computers, but instead use registry books, printed receipt blocks, etc.

¹ Annex: List of documents that have to be present in a WCA office

² Annex: Example of an annual WCA budget, Annex 033: Template for an annual WCA budget

³ Annex: Example of an operation, maintenance and monitoring plan

⁴ Annex: Template of accounting policy

1.5 Tariffs and billing

Importance of water tariffs

Stable revenues covering the costs of service provision are critical to the sustainability of all WCAs. A decline in service quality due to insufficient maintenance will lead to a drop in customer satisfaction and therefore negatively affect payment morale, leaving the WCA with even less money for essential repairs.

Water tariffs that reflect the full cost of service provision and good management practices ensuring that all water consumed is billed and paid are therefore of crucial importance for the WCA. In particular it is necessary to review the tariff concept and billing strategy on a regular basis, taking into consideration all the operational costs as well as costs for asset renewal, replacement and repair.

The WCA members are the main decision makers in tariff setting. At the same time they are the customers paying the tariffs, and thus have a natural interest in low tariffs. The WCA management needs therefore to employ good communication towards the members and ensure clear tariff structures and transparent procedures of tariff calculation in order to make WCA members accepting the tariffs necessary to generate sufficient revenues.

Procedure of tariff setting

According to the Law on local public administration No. 436-XVI of 28 December 2006, the tariffs for public services have to be approved by the local municipal council. The WCA president, supported by the accountant, calculates and proposes a tariff according to the effective costs, which is then adopted by the general assembly and proposed to the municipal council for approval. It is planned that the responsibility for approval of tariffs will be shifted to the National Regulatory Agency of Moldova (ANRE), however it is not entirely clear today if this would also apply to community based operators.

Tariff calculation

Tariffs are calculated to provide sufficient revenue to fully cover the costs of services provided. The main cost pools to consider are the following:

- **Capital expenditure and costs of capital:** capital invested in fixed assets, e.g. constructing the infrastructure and interests of loans for capital expenditure, normally occurring either as loans and interests to be paid back, or as lease fee for using infrastructure assets.

- **Operating and minor maintenance expenditure:** routine recurrent expenditures to keep the system running, such as labour, fuel, electricity, chemicals, materials
- **Capital maintenance expenditure:** expenditure on asset renewal, replacement and repair that goes beyond routine maintenance

In the projects supported by ApaSan, capital costs were completely covered by the members' contributions and non-reimbursable financial contributions from LPA and the Swiss and Austrian governments. Costs for loans and interest are not occurring to the WCAs in these projects. Also, the Mayoralties that own the infrastructure are not charging any lease fees for the use of the infrastructure. Therefore, capital expenditure and costs of capital do not need to be covered by revenues from tariffs in this type of projects.

Figure 3 summarises the structure of expenditure as it was observed in ApaSan's partner WCAs. The most important cost bloc was operating and minor maintenance expenditures, with salaries of staff and energy costs taking the main share of expenditures. The expenditure on capital maintenance such as assets renewal and repairs were generally very low, as the systems are quite new and only few facilities needed repair or replacement.

Tariffs applied by these WCAs in the last years were generally sufficient to cover these expenditures. However, tariffs were rarely revised and as operating prices are raising, in particular due to rising energy costs, some WCA start having difficulties to cover their costs. This situation may be exacerbated in near future, in particular if a WCA continues to shy away from revising tariffs to increase revenues, as higher expenditures for assets renewal are likely to be required.

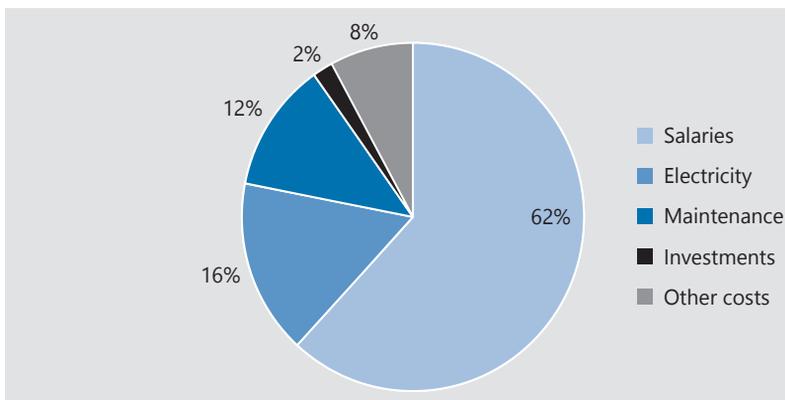


Figure 3: Structure of expenditures of WCA
(Average data of 18 WCA in 2013; WCA Rapid Assessment 2013, ApaSan)

The conclusion from these experiences is that it is very important to conduct longer term financial planning over several years. The planning needs to take into account both expenditure for asset renewal to be expected in future and realistic predictions of the development of operating costs. This allows predicting the revenues required over a longer period and needed tariff revisions for generating these revenues.

Tariff structure

The tariff is composed of a fixed monthly charge (*abonament*), and a variable price component for each m³ of water consumed. In ApaSan's partner WCAs, fixed charges are between 5 and 10 lei per month and the water consumption tariffs range from 4 lei/m³ to 12 lei/m³ (Table 2). The revenue generated through the fixed charge ensures a steady income stream to cover on-going costs like salaries or office rent, even in periods of low water consumption or absence of the house owner.

Table 2: Water tariffs applied by 18 water consumer associations (WCA Rapid Assessment 2013, ApaSan)

Village	Households served	Fixed charge (abonament) MDL	Normal Tariff MDL/m ³	Threshold m ³	Elevated tariff for high consumption MDL/m ³
Secărenii Noi	83	10	12	>15	25
Pereni	196	6	4	-	
Mireşti	200	10	8	-	
Scoreni	210	10	10	>5*	30
Şipoteni	213	5	8	>5	12
Horodca (Ialoveni)	287	10	12	-	
Buciumeni	302	0	10	-	
Paşcani	306	5	4	-	
Ciuteşti	379	5	6	>10	50
Cristeşti	402	6	4	-	
Călmăţui	403	5	5	>6*	25
Boldureşti	428	4	4	>6*	100
Iurceni	462	7	7	>10*	50
Zberoaia	470	5	6	>5*	15
Cărpineni	519	5	7	>7*	50
Bălăureşti	540	5	5	>10	10
Drăguşenii Noi	550	10	9	>7*	50
Cioreşti	665	5	6	>20	10

* During summer months

Block tariffs are a common practice to prevent excessive water consumption, which would jeopardise the provision of drinking water to the other connected households: a higher consumption tariff is applied as soon as a monthly threshold (*limita de consum*) of water consumed has been reached. The threshold has been set between 5 m³ and 20 m³ per month and the corresponding higher consumption tariffs range from 10 up to a more severe 100 lei/m³. Such block tariffs are often introduced during summer months to prevent water shortages induced by excessive use of water for non-domestic purposes such as irrigation.

Billing

The fixed charge and the water consumption tariff is billed on a monthly basis. The technician follows a defined route to read the meters of each household, notes the meter reading in his recording table¹ and reports it to the accountant. The bill² is calculated according to the metered water consumption. The payment order is communicated to the customer by the technician on his next metering round or the bill is presented to the consumers when they show up personally at the WCA office to pay. Usually, this procedure is done monthly, but in a lot of associations the winter months are skipped, because most of the water meters are covered with straw or cloth in that time to protect them from freezing, making them difficult to access. During the winter months, people thus just pay their estimated consumption and the difference to the actual consumption is then taken into calculation in spring when water meters are easily accessible again.

Debt management

Usually the contract between the WCA and its members contains a clear procedure in case of non-payment. This means displaying a list of debtors, reminding them constantly and eventually, disconnecting them from the system if the payment is not fulfilled after some time. Some WCAs maintain a list of debtors, which is publicly displayed in the office, the village hall or near the church. Sometimes the list is even read out loud during the general assembly.

Some WCAs do not put these procedures into practice, leading to substantial unpaid bills and thus suffer considerable revenue losses. On the other hand, the WCAs which put in practice good debt management, e.g. have a good register of debtors and clear procedures for reminding debtors, have very low accumulated debts and actually rarely need to take drastic measures such as disconnecting consumers.

¹ Annex: Format for recording of household meter readings

² Annex: Example of a water bill

1.6 Operation and maintenance of the system

Success and failure of the water supply system depend on its good maintenance.

The most important operation, maintenance and monitoring activities¹ include the following:

- Keeping records and general observations of how well the water system is functioning (e.g. if sufficient water is produced, pressure in the network is maintained, continuous supply etc.)
- Operating and controlling disinfection well, taking care of chemicals supply
- Recording water consumption, water production, water delivered into the network and water losses²
- Verifying operation on household water meters, repairing or replacing damaged water meters, calibration of water meters
- Cleaning and disinfecting reservoirs and pipes in planned intervals
- Controlling and maintaining the protection zone of the water source, e.g. cleaning manholes, repairing fence.
- Checking technical status of all installations (catchment works, reservoirs, pump stations, distribution manholes), cleaning and periodical protective maintenance (painting, small repairs etc.)
- Repairing damage in the network
- Servicing equipment that needs regular maintaining (e.g. pumps)
- Manage a stock of spare parts, water meters and materials for repairs
- Recording all maintenance actions and observations on other events related to the water system

Guaranteeing good operation and maintenance depends on the competence of the technicians. However, successful operation and maintenance also relies on good planning. It is an important task of the WCA president to assure that operation and maintenance is planned properly and that the planned actions are executed according to plans.

Operation and maintenance plans usually list the recurring tasks, such as daily tasks, monthly tasks and tasks needed at larger intervals. Actions needed to resolve occasionally occurring problems, such as pipe leakages, cannot be scheduled in

¹ Annex: Example of an operation, maintenance and monitoring plan

² Annex: Monitoring forms for recording interventions, evidence of services provided to WCA members, recording of rainfall, recording of water flows into reservoirs and networks, calculation of water balance

time. Therefore it is important to establish standard procedures that can be used if unplanned events or emergencies occur.

Experience with ApaSan's partner WCAs has shown that good planning is often a challenge and not sufficiently valued by the WCA staff. Future efforts of ApaSan will concentrate on reinforcing planning capacities and also introducing more comprehensive concepts such as preventive management and water safety plans.

Box 3: What about sanitation?

Improvement of the water supply situation should in principle always be complemented by the improvement of the sanitation situation, in particular because better water supply often means more wastewater to handle.

However, the experience of ApaSan has shown that even after the construction of a piped water systems with connections to all houses, water consumption of inhabitants in a Moldovan village remains low, at about 25-30 litres per capita and day (see also Box 1).

Only few people install plumbing inside the house and connect water consuming equipment such as kitchen sinks, showers, or washing machines that needs a connection for disposal of wastewater. Most people continue to bring water with buckets to kitchens and washing places and simply pour water after use into the garden.

Also most people continue to use the pit toilets in the garden rather than installing flush toilets.

Consequently, there is very little wastewater that could be collected in a village wide sewer system and thus almost no interest of villagers to be connected to such a system, and even less interest to pay for such a connection. Sewer systems and wastewater treatment plants serving entire villages are therefore neither needed nor financially feasible in most Moldovan villages today.

Improvement of sanitation facilities should focus on individual solutions to solve localised problems or for upgrading facilities to a better standard. Such improved individual sanitation solutions typically include the following:

- Households that install flush toilets and improve plumbing in their house and thus may have increased amounts of wastewater to deal with can install septic tanks and soak pits for safely disposing the wastewater on their own plot.
- Households that do not want to install a flush toilet but still want to replace their pit latrine by a more comfortable solution may install ecosan toilets (urine diverting dry toilets).
- For schools or other institutional buildings, ecosan toilet blocks or flush toilets connected to a small wastewater treatment plant may be installed.

Part 2 How to implement a decentralised and community managed water supply system?

2.1 Overview of the process

The model for decentralised and community managed water supply systems is based on the idea that participation creates ownership and therefore ensures sustainability. The process of implementing a water supply system until its inauguration is therefore in principle driven by the interested community and the local public administration themselves.

However, in the practice of ApaSan supported projects, the ApaSan project facilitation unit had the important role of acting as facilitator and coach, guiding the community throughout the process of implementation and providing technical assistance. Furthermore, ApaSan administered the financial contributions to the investments on behalf of the donor organisations.

In the following chapters, the implementation process is described step-by-step as recommended by ApaSan based on its past experience. The term **project facilitator** is used in the following to describe the organisation (such as ApaSan) taking the role as facilitator and coach for communities and LPAs. Other organisations interested in implementing similar projects may use the entire process or parts of it and adapt it to their specific requirements.

The project implementation process covers the described in the following figure.

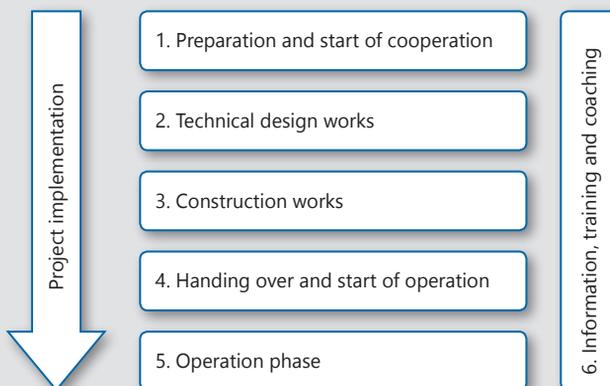


Figure 4: Overview of the steps of the implementation process

The most important contributions in each of these steps by the local community, the local public administration and the project facilitator, as well as the main milestones throughout the process are summarised in Table 3. While steps 1 to 5 are conducted more or less sequential, information, training and coaching activities are conducted throughout all the steps.

Table 3: Roles of main project partners and major milestones during the implementation process

Implementation Step	Community / LPA	Project facilitator (e.g. ApaSan)	Major Milestone
1. Preparation and start of cooperation		Inform on decentralised water supply model	
	Submit request for support		Project request
		Check quantity and quality of water source	Project facilitator's decision on technical feasibility and on whether or not to enter into collaboration with community/LPA
	Organise community meeting	Inform on process and terms of collaboration	
	Form and officially register WCA		WCA registered
	Register members and collect of membership fees		Community contribution on project account
	Sign collaboration contract	Sign collaboration contract	Collaboration contract
2. Technical design works		Tender and contract design works	
	Help obtaining approvals of designs by competent authorities	Assure quality of designs	Completed design and approvals for implementation
3. Construction works		Tender and contract construction works	
	Community participates in construction works	Assure quality of construction	Infrastructure of water supply system
4. Handing over and start of operation	Help obtaining final acceptance of works by competent authorities		Water supply systems officially approved and ready to be operated
	Mayoralty: give concession to WCA		Concession contract
	Recruit WCA staff	Provide training to WCA staff	WCA operational
	Inaugurate of water supply system		Inauguration
5. Operation phase	WCA staff: seek advice, exchange with peers and participate in training activities	Monitor, facilitate exchange of WCA staff with peers, offer advice and training	Lasting operation, affordable tariffs, connecting more households to the water system

Full details on the implementation steps are given in the following chapters. Materials, templates and sample documents useful for the implementation of projects are referenced in footnotes in each chapter; a comprehensive list is given in the annex.

2.2 Preparation and start of cooperation

Informing on decentralised water supply model

Many communities and LPA are already aware of the water supply models applied by ApaSan because of the long lasting SDC support to rural water supply. However, outside central Moldova, where the programme had its initial geographical focus, the decentralised water supply models are less well known and further promotion may be required.

Possible means of information and promotion are:

- Direct approach of village and *Raion* leaders
- Distribution of information material among LPA I and LPA II
- Triggering media coverage
- Providing information about implemented projects and facilitating exchange of experience, such as organising visits to villages with successful projects

When approaching interested communities or representatives of the administrations, the project approach, procedures and conditions for cooperation need to be presented in a clear and transparent form.

Receiving requests for support

Requests by communities for support can be collected in different ways. Formalised calls for proposals or receiving requests on a continuous basis are frequently practiced options. As a minimum guidance for formulating requests: interested communities or LPAs should be informed of the specific data they need to supply with the request and given clear information about the selection criteria, procedures and expected time needed for assessing the request.

Box 4: ApaSan's selection criteria

ApaSan collects requests of interested communities on a continuous basis. The requests are screened and those of acceptable quality and that fit into ApaSan's strategy are then assessed in detail regarding their feasibility.

The criteria for assessing project feasibility are the following:

- Are there water sources with sufficient quality and quantity?
- Is the community willing to form a WCA and to financially contribute?

If these questions can be answered positively, then ApaSan will begin cooperation with the community.

Obviously, this selection procedure is specific to the nature of the ApaSan project. Other organisations funding or supporting rural water supply projects may employ different methods, such as formalised public calls and different selection criteria.

Are there water sources with sufficient quality and quantity?

The model for decentralised water supply systems with local management is well tested and proven so far only for systems with water sources available in reasonable distance from the village(s) and with water not requiring treatment beyond simple disinfection. Therefore the availability of such water sources is one of the important criteria to decide on the feasibility of a project in a village and needs to be carefully checked prior to the decision on support.

The question whether the existing water sources yield sufficient quantity of water is answered by comparing estimated demand with measured yield.

Demand is assessed based on the number of population, assuming a stable population (no growth/no decrease) and a per capita consumption of 50 litre per person a day plus the estimated demand for schools and other public buildings (see also Table 4). Industrial and commercial consumption is also considered where present. Consumption for irrigation of gardens or orchards is generally not included (see also Box 1).

Yield of the water source is rather difficult to assess reliably without data over a longer time period. Besides measurements it is therefore important to take into account the knowledge and observation of local informants. Measurements need to focus at the point of the year where they are known to produce least. Typically, the flow of a spring is measured by channelling water into a collection basin, from where the flow can be measured with bucket and stop-watch.

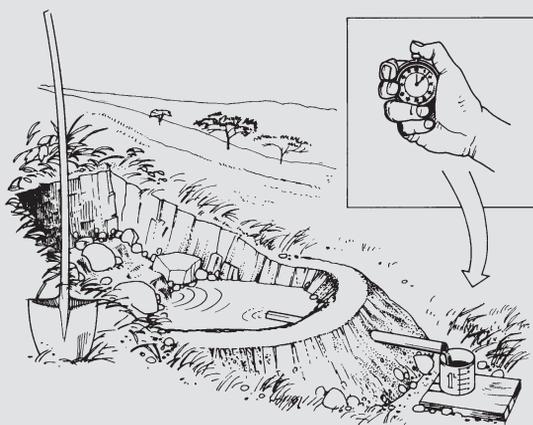


Figure 5: Measuring the yield of a spring¹

The **quality of the spring water** is assessed by conducting a sanitary survey, complemented with bacteriological, chemical and physical water analysis. A sanitary survey examines the surrounding environmental hygiene conditions and any potential causes of spring water contamination such as latrines, farming activities, surface waters, cemeteries upstream of the water source. Natural protection through forests or impermeable soil layers should also be assessed. The analysis of bacteriological, chemical and physical water quality² is mandatory, ideally being monitored over a whole year. Water samples are normally analysed by the laboratory of the Public Health authorities at *Raion* level, however it is usefully to do some quality control by cross analysing samples in other laboratories.

Clarifying the ownership of the chosen spring including the area required for the protection zone is helpful to assess possible complications with land acquisition and compensation.

Next steps for discussing cooperation modalities with the community should only be undertaken if the water sources are found to provide sufficient water in good quality.

In villages where no adequate springs can be identified and connection to a neighbouring village or town is not feasible, research needs to be undertaken to identify suitable deep wells or surface water resources. This usually involves cost and time intensive procedures of test drilling and determination of suitable

¹ Annex: Spring Catchment, Series of Manuals on Drinking Water Supply, Skat, 2001

² Annex: Decision 934 on water quality requirements for drinking water

treatment options, which again will lead to higher construction and operational costs. Water supply systems fed by other sources than spring will be addressed in the next version of this Guidebook.

Box 5: Terms of collaboration applied by ApaSan

Community:

- Contribution of a cash amount (usually 2,000 lei) and 10 days of labour per member of the Water Consumer Association to be formed
- Membership of at least 75% of households with permanent residents (checked with cadastral plan and officially confirmed by the municipal council) in the WCA and payment of all entry fees within an agreed time (e.g. 6 weeks)
- Commitment of the municipal council to delegate management of the water supply system to the WCA
- Formal establishment of the WCA; functioning of the WCA according to its statutes
- Determination and acceptance of a cost-covering water tariff for water consumption by WCA, validated by the General Assembly and approved by the LPA

Local Public Administration:

- Commitment of Municipality and *Raion* for support of the construction and commissioning of water supply systems
- Commitment to financial contribution to the project (at least 10 % of the total costs)
- Support during the formation and registration of the WCA
- Approval of the tariff proposed by the WCA according to its calculation
- Providing the concession for operation of the water supply to the WCA

ApaSan:

- Support during formation and operation of the WCA
- Financial support of 50 - 80% of the costs necessary for the design and construction of a new water supply system
- Technical assistance in the planning process
- Training and support concerning construction and operation of water supply systems

Is the community willing to join into a WCA and to financially contribute?

Experience has shown that the sustainability of infrastructure projects is highly dependent on the ownership by the community. The willingness of community members to financially contribute is a strong indicator that a real demand for the investments exists and that the community will feel a strong ownership of the water system. For these reasons, the condition of financial contributions by the communities should be brought forward by the project facilitator right from the start.

For assessing the willingness to contribute, it is useful to organise an **initial community meeting**. The purpose of the meeting is to clearly communicate the process and the **terms of collaboration**¹, that means the project partners' obligations to fulfil during the project. Mayors and the presidents of a WCA of a neighbouring village that are already successfully operating a water supply system may also be invited to the meeting to share their experience.

The initial community meeting normally results in the decision of the community whether or not to embark on the proposed collaboration scheme. If the decision is yes, the community should undertake the steps described in the following.

Formation of WCA

A WCA is constituted formally by the households interested in joining the project, by holding a general assembly meeting and electing a president. In line with the existing legal framework, the Water Consumers Association, which is a local public association, needs to be registered with the local public administration authorities. The registration process comprises of 9 steps and results in an official status of an association, a bank account, a fiscal code and a WCA specific stamp².

Households interested in joining register one representative of the household as member. Members are accepted upon payment of a membership fee, which is used as contribution to the project investment, and for which members will receive a house connection upon completion of the construction works. It is recommended that the WCAs issue a membership card or booklet that can be used as a voting credential at the General Assemblies, and a printed copy of the WCAs statutes. All membership fees are transferred to a special account that will be used to cover part of the design and construction costs. The president, mayor and members try to mobilise as many households as possible to join the WCA for reaching the defined quota.

¹ Annex: Example of cooperation offer of ApaSan for support for establishing community managed water supply systems

² Annex: Description of the WCA registration procedure

Particular attention has to be paid at the inclusion of socially vulnerable households at this stage. More information on this is given in Box 6.

Conclusion of collaboration contract

Once sufficient members have registered, proven by a list of members and fees received on account, the contract of collaboration can be signed between WCA, *Primaria*, *Raion*, and the project facilitator¹.

¹ Annex: Example of a cooperation contract

Box 6: Inclusion of socially vulnerable households

The **human right to water and sanitation** requires that water and sanitation services are available, accessible, safe, acceptable and affordable for all people without discrimination. Translating this concept to the context of decentralised water supply systems managed by WCA, it means that the WCA, the local administration and the community should all aim at connecting all households in the village to the water system. However, in the reality of implemented projects, there is usually a number of households that are not connected to the water systems for a range of reasons; the most important ones include the following:

- Households do want to be connected in principle, but are not capable due to social or financial reasons.
- Households did not join the WCA during the project implementation project because they did initially hesitate and later on are not able to be connected because of too high barriers (non-acceptance by the WCA, higher membership fee, etc.).
- Households that do not want to be connected because they have other water sources.

Ensuring inclusion of all households and connecting all households to the water system is a challenging issue for the WCAs because they cannot simply waive the membership fee or allow for a lower water tariff for disadvantaged households. Seen that most households in Moldovan villages are quite poor, lowering tariffs for some would quickly raise discontent of others and lower the overall willingness of WCA members to pay water bills. Lower payment morale and discontent of consumers with the tariff policy would quickly put at risk the financial sustainability of the WCA and thus the operation of the water system.

The issue of including all households in the villages must therefore be tackled carefully and based on a clear and transparent policy on the inclusion of socially vulnerable households. This policy has also to consider the fact that support to socially vulnerable people is above all the duty of local public administrations and not of a water consumer association.

The following elements for a policy on inclusion of socially vulnerable households are recommended:

- Much effort should be taken for motivating as many households as possible joining the WCA at the initial stage, as joining later on is generally more difficult for households with low income due to higher membership fees applied after completion of the project.
- Poor households can be supported to join the WCA by various means at the initial stage, such as permitting contribution of the membership fee in kind instead of cash (labour during construction works), or direct financial support by the Mayoralty to poor households.
- Awareness raising of LPAs and WCA members on the issue of human rights and inclusivity and by such increasing the willingness among WCA members to support poor households.
- After completion of the system: WCA and Mayoralty registering non connected households, analysing reasons of non-connection and developing a plan on how to support all in need. Types of support may include: financial support by the Mayoralty to households; provision of water for free but at lower service level as the paid household connections (e.g. public stand posts in reasonable distance); offering delayed or staged payment of membership fees; etc.

2.3 Technical design of the water supply system

Tendering and contracting

Rules and procedures for tendering and contracting design and construction works are generally defined in a collaboration contract.

In projects co-funded by national or international financing institutions, these intuitions generally have specific requirements for tendering and contracting procedures. ApaSan's practice regarding tendering is described in Box 7. In other projects with different funding or support, it is important taking into account the legal situation and the policies of financial contributors when defining the tender procedures.

Examples for tender documents and contracts as used by ApaSan are given in the annex¹. The tender documents for design works typically contain the following elements:

¹ Annex: Example of tender documents for the design of a water supply system

- Call for proposal
- Terms of Reference
- Offer form
- Tender opening document (= registration)
- Evaluation report and proposal for adjudication

Box 7: Tendering rules in ApaSan supported projects

ApaSan usually carries out the tendering process on behalf of the WCA, Municipal Council and *Raion*. In projects that are co-funded by more than 50% from Swiss and Austrian funds, ApaSan generally uses public tender procedures to acquire services for design and construction of the water systems. ApaSan has developed its own tender procedures that are based on Swiss and EU best practices for guaranteeing transparency, accountability and cost-efficiency as well as allowing for selecting competent and capable service providers.

ApaSan generally applies the following rules in its tenders:

- The evaluation committee is composed of at least 3 ApaSan team members.
- The opening of bids is held in presence of the bid evaluation committee; all bidders as well as the project partners such as mayors, *Raion* representatives, WCA presidents, donor representatives are invited to the bid opening. The results of the opening are documented in minutes which are distributed to all interested parties.
- The main evaluation criteria are technical capacity and experience of the bidders as well as price. The main weight is given to the technical capacity and experience.
- The evaluation is conducted by the bid evaluation committee; the process and decision is documented in the evaluation and adjudication report.

Design

Traditionally, technical designs in Moldova are done under rigid application of the available norms and standards. However, the Moldovan normative framework on water supply in many aspects no longer complies with the current social and economic situation. The rigid adherence to outdated standards often leads to oversized or inappropriate facilities that are expensive to operate and thus difficult to be operated sustainably by small water consumer associations.

Therefore, in tenders and contracts for technical design of rural water systems¹, as well as during coaching of design engineers, engineers should be encouraged to

¹ Annex: Example of a contract for the technical design of a water supply system

apply a flexible approach in preparing water supply designs, to base designs on real data and realistic estimations reflecting the current situation in rural Moldova, as well as to take into consideration several alternatives and options before selecting an optimal solution for each individual situation.

The following table summarises the most important design criteria recommended for the design of rural water supply systems, based on ApaSan experience.

Table 4: Design criteria for rural water supply systems, as recommended by ApaSan

Design criteria for rural water supply systems	
Water sources	If possible, water sources with good quality not requiring treatment are to be preferred (cheaper operation and less vulnerable to defects)
Pumping stations	If possible, purely gravity driven systems are to be preferred (cheaper operation and less vulnerable to defects)
Connection rate	100% of households in the location
Design horizon	25 years
Domestic water consumption	50 litres per person and day (based on data from 22 rural water supply systems implemented between 2001 and 2011)
Water consumption in schools	12 litres per pupil and teacher (based on Moldovan standards)
Rate of population growth	0 % (assumed stagnation of population growth, reflecting the reality of continuing emigration from villages to cities or abroad)
Water consumption for economic activities, irrigation, etc.	Only to be considered for locations with intensive economic activity, based on specifically justified calculations
Maximum pressure	6 bar
Flow velocities at normal operation	Minimum: 0.3 m/s, maximum: 3 m/s
Provisions for firefighting	Hydrants located only on pipe sections with a flow of > 5 l/s (except for specifically justified cases) or water reservoirs for firefighting with a volume of > 54m ³ (flow of 5 litre/s for 3 h)
Pipe materials	Polyethylene (PE)

Quality assurance

Foreseeing specific quality assurance procedures during the technical design phase allows coping with the challenge of variable capacities of design companies in the local market. The aim of quality assurance in technical designs is mainly to eliminate major design flaws, ensure a minimum standard of quality and ensure that facilities with cost efficient operation are chosen.

For assuring good quality of designs, it is recommended to include in the contracts with design companies clearly defined deliverables at several key intermediate stages during the design process. These deliverables can then be verified corrective actions can be requested if needed. Table 5 lists typical deliverables specified in ApaSan design contracts.

Providing sample or reference designs for specific structures is also a means to achieve better quality of designs¹.

Table 5: Deliverables in contracts for technical designs, as practiced by ApaSan

Design Stage	Deliverable	Duration
General layout	General layout of the water supply system, including alternative options	4 weeks
Hydraulic calculation	Hydraulic dimensioning of the system for normal consumption Hydraulic dimensioning of the system for supplying demand for fire fighting	3 weeks
Final design	Design of the catchment area Detailed design of the water reservoirs Detailed design of the pumping station Detailed pipe layout including locations of the manholes Detailed specification of valves and fittings	6 weeks
Final design + official verification	Cost estimations and verified final design	4 weeks

¹ Annex: Reference plans of a reservoir
Annex: Reference plans of a pumping station
Annex: Reference plans of a spring catchment

Approvals

Generally the designer is responsible for obtaining all the approvals and permits for the technical design as it is considered part of the design works. However, it is recommended to clearly specify this in the contract. At the same time it is very important that the mayor facilitates obtaining the approval in order to get them faster. This is a reason why a good collaboration between all stakeholders is crucial.

Authorities normally insist on strict adherence to existing standards and norms when delivering approvals. However, as described above, technically and economically viable designs of small rural water systems that are based on assumptions and estimations reflecting the real current situation are often only possible with certain deviations from or adaptations of provisions in existing norms and standards. Experience has shown that these obstacles can be overcome if motivation and needs for such deviations are clearly and transparently communicated.

2.4 Construction works

Contracting

The contracting process for construction works is similar to the one described in the chapter for design works. The main difference is the content of the tender documents and that in the evaluation of offers, normally more weight is given to the price.

The documents used by ApaSan¹ in the process of tendering construction works typically contain the following elements:

- Newspaper advertisement for the tender
- Call for proposal with instruction to the bidders (e.g. scope of application, deadlines, templates)
- Technical tasks and technical specifications
- Bill of quantities
- Technical design documentation is available on-line or at ApaSan's offices for consultation
- Offer form
- Tender opening document

¹ Annex: Example of tender documents for the construction of a water supply system

- Eligibility requirements
- Proposal for adjudication

Construction of spring catchment

Constructing the spring catchments is often a type of work difficult to be planned in detail before the start and that requires a good degree of “reading” the landscape and re-directing excavation works as they progress. Therefore in most cases is easier to not include the construction of catchment facilities in the general construction contract but to have them directly executed by the WCA (manual work) and a construction company (mechanical work with excavator, trucks etc. on demand) under technical direction of experienced engineers of the project facilitator. Work on catchments also often commences ahead of the start of work by the contractor. The members of the community often contribute with labour for digging of trenches and manholes of the facilities.

Box 8: Traditions regarding water sources

According to Moldovan tradition, to dig a well is a great thing and each person during life needs to achieve such a deed. This is why most of the WCA members normally get actively involved, particularly the older ones. However, it is uncommon that women participate in this kind of activities.

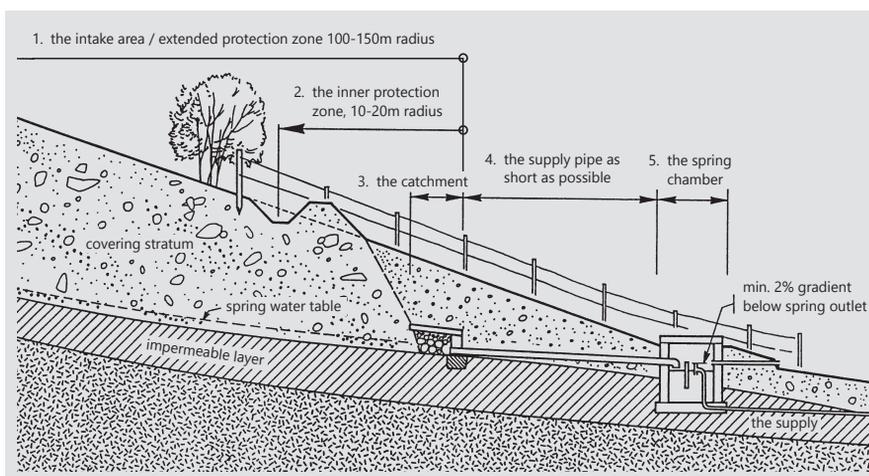


Figure 6: The five components of a spring catchment¹

¹ Annex: Spring Catchment, Series of Manuals on Drinking Water Supply, Skat, 2001

Household connections

For household connections, it is recommended that the pipe up to the connection chamber, the valve, water meter and tap are installed by the contractor and are covered by the membership fee.

The connection chamber needs to be located inside the property, as close to the plot boundary as possible (1-2 m). However, the owner may be allowed to make a request for the chamber and meter to be placed further inside the property when he/she can assure unrestricted access for WCA staff for repairs and meter reading.

The construction of the connection chamber itself and all plumbing from the connection to and inside the house lie in the responsibility of the household. The WCA should assist the households in the construction of the chamber by providing construction plans and giving technical assistance¹. The WCA keeps a checklist of all households tracking the progress of the work². Once the chamber is completed, the contractor or the WCA technician can install the water meter. Final confirmation of the quality of the construction is in the hand of the official construction supervisor.

General construction works

All construction works for structures such as pumping stations and reservoirs as well as of the distribution pipes, manholes and accessories are in general carried out by the contractor based on the design specifications³. If defined in the collaboration contract, WCA members may participate in the work and thus provide in-kind contributions. Labour provided by community typically comprises works such as digging of trenches for pipes and manholes, cleaning of catchment sites and the building of fences around protection zones.

Construction supervision

The Moldovan law requires that the contracting authority appoints a supervisor (*Responsabil tehnic*) who is responsible for supervision of construction works and checking the quality of the works. However, in practice the provisions of the usual contracts for supervisors are not permitting the supervisors to spend sufficient time on the construction site for providing a real supervision. The technical logbook (*Cartea tehnica*) is an official document in which the supervisor should document on a daily basis all observations and decisions made in the field. However it is

¹ Annex: Instructions for building the chamber for a household connection

² Annex: Progress checklist about payments and construction of connection chambers

³ Annex: Example of a contract for the construction of a water supply system

common practice that this document is only filled after completion of works and thus does not provide a documentation of real observations. In consequence, the usual practice is not a guarantee for good quality of construction works.

For this reason, it is recommended to apply a project management system for the construction phase that ensures that all stakeholders are aware of their responsibility for the quality of the work and take measures to assure it. The recommended project management system is a list of tasks for every step of the construction, the clarification of roles of implicated persons, and definition of responsibilities and frequencies. It is documented in the form of an excel document with a list of annexes with legal references and templates¹.

The project management system should be clearly presented to all stakeholders and introduced at the construction site, and be used as a binding part of the contract with the construction contractor and the technical supervisor. It fully conforms with Moldovan legislation but goes beyond the usual practice in order to ensure a real quality assurance in construction.

An important aspect of the project management system is that it reinforces the role of the technical supervisor. The services requested from this person will be of higher quality than usual, in particular a stronger presence at the construction site will be requested. This also means that this supervisor needs to receive a better payment compared to the usual practice.

A simple but very efficient improvement measure for achieving a better management is the strict requirement that the technical logbook has to remain permanently on the construction site and be always kept up to date², thus ensuring good documentation and accountability. Another very efficient measure is to hold weekly site meetings at the construction site with written minutes signed by all stakeholders present³, thus ensuring regular follow-up and clearly determined responsibilities.

Acceptance of the works and official approval for putting into operation

For the acceptance of the finalised works (*Recepția la terminarea lucrărilor*)⁴ a committee of minimum five persons is organised. It consists of representatives of the funding organisation, Municipality, Fire fighting department, National Center for Public Health, Raional Department of Inspection in Construction and other

¹ Annex: Project management system for quality assurance in the construction of water supply projects

² Annex: Cartea tehnica / Logbook for construction works

³ Annex: Template for minutes of meetings of weekly construction site meetings

⁴ Annex: Example of minutes of the reception of finalised works

relevant specialists. The commission has the task to verify if the requirements of the construction authorisation, the permits and the conditions for construction were respected, if the work were done according to the contract, the technical design, and specific regulations and if the quality of work is satisfactory. All the observations of the committee are documented and the contractor has to solve all observed issues.

For the final reception (*Recepția finală*)¹ the committee verifies if all the observations mentioned in the act of acceptance of the finalised works were solved. When the act of final acceptance is signed, the system can be officially put into operation.

The whole process is regulated by "*Regulamentul de recepție a construcțiilor și instalațiilor aferente*" approved by government decision nr. 285 from 23.05.1996.

2.5 Handing-over and start of operation

Handing over and delegation of operation

Following the official reception of works, the water supply system has to be formally handed over from the project facilitator or representative of the financing institution to the Municipality by means of a donation contract. This contract describes the value of the assets to be taken into the balance of the Municipality, as well as the obligation of all parties².

The operation of the water supply system is then delegated from the Municipality to the WCA through a concession contract, in which the Municipality concedes the operation of the system to the WCA for a determined period³.

Inauguration

After the finalisation of the construction works, an inauguration ceremony is usually organised by the Mayorality and the community. Such an event can generate public interest and increase awareness and ownership of the project within the community. It is also useful to use the occasion for inviting decision makers from local and national authorities as well as from neighbouring communities.

¹ Annex: Example of minutes of the final reception

² Annex: Example of a donation letter from ApaSan to LPA

³ Annex: Example of a concession contract between a LPA and a WCA

Setting up the office

For the WCA to take up operation, an office is required. In general the Mayoralty provides appropriate rooms; the equipment is purchased by the WCA president using financial contributions as specified in the collaboration contract. A list of equipment needed in a typical WCA office is given in the annex¹.

Recruitment of WCA staff

Staff of a WCA are formally recruited and salaried only once the construction of the water supply system is completed and the operation taken over by the WCA. However, president and sometimes accountants may take up work and receive some remuneration during the construction phase, based on WCA Council decision. These payments may be done from funds collected from the community, e.g. from community contributions that exceed the contributions required by the project facilitator.

It is recommended to recruit the technicians among villagers that took part in the construction works of the water system as employees of the construction company. In this way they can work alongside the field technicians and engineers during construction and can become familiar with the layout of the system and learn the skills required for repairing or replacing pipes and fittings. Such on-the-job experience is very useful, though of course it cannot replace appropriate formal training for technicians. Selection criteria for technicians are:

- Reliable and respected person with permanent residence in the village
- Able and willing to keep records of water consumption and maintenance/repair tasks
- Previous technical experiences or clear interest and aptitude during training
- Mobility and easy accessibility

Accountants are generally recruited by the president after the completion of works. The main selection criterion is:

- Education and prior experience as accountant

Thorough training of staff on all relevant issues required for the operation of the organisation and the water system is important at this stage, as all staff, including the president, have normally no prior experience in managing a water system. If ever possible, the training of staff should start before the finalisation of works, so that staff is ready to take over the operation of the system when works are finalised.

¹ Annex: List of equipment needed in a WCA office

Connection of new consumers

Most households join the water consumer association at the beginning of the project, when the WCA is formed and the community contribution is collected. However, some households may not join during that phase because they do not want or are not able to. These households can join the WCA later at any stage in principle, however usually the WCA board establishes a higher membership fee for the late comers.

The higher fee is justified by the fact that the households that joined at the beginning were taking a higher risk (not being certain that the project will really come true) and because late-comers will not be able to contribute with labor, as initial WCA founding members did. On the other hand, the higher membership fee may constitute an important obstacle for connection of all households to the water system, in particular the socially vulnerable ones. A specific policy needs to be in place for dealing with these cases and achieving inclusion of socially vulnerable households (see Box 6).

2.6 Operation phase

The guiding function of the project facilitator ceases once infrastructure construction, formalities of handing over and training of WCA staff are completed and the WCA starts operating normally. However, it is natural that full skills and needed experience of staff only develops with a certain time of operating. Also, many minor or major difficulties may not have been foreseen during the implementation process and only become evident after a certain time of operating. In this initial phase of operation, which may last anything from one to several years, it is important that the WCA staff can rely on occasional or periodical support for trouble shooting, for acquiring additionally needed skills or for refreshing content of earlier trainings.

It is therefore strongly recommended that the project facilitator provides such support as part of its support in the operation phase to all of its partner communities even after several years of completion of the implementation.

Box 9: ApaSan support to WCAs in the operation phase

ApaSan's support in the operation phase includes the following services:

- Maintaining contact with the WCA presidents and **reacting on demand for support** on solving unexpected difficulties or other issues.
- Offering **periodical training sessions** on the full range of important issues (chapter 2.7). Usually these sessions are held in the form of meetings or trainings with participation of several WCAs. WCA president meetings are held between 2 and 4 times each year.
- Facilitating the **exchange with peers**, e.g. WCA presidents meeting their counterparts from other WCAs and having the opportunity to exchange experiences and learn from each other. Similar exchanges are facilitated for accountants and technicians. Many of the above mentioned training sessions serve at the same time as exchange forum.
- Conducting **performance assessments** of the WCAs, analysing governance, financial management and technical management aspects. The performance assessments determine the status of sustainability of operation and allow identifying the main fields where the assessed WCA need improvements. The assessment results are used to provide detailed recommendations to the WCA and to tailor further capacity development measures for the individual WCA or a group of WCAs.

The need for support of WCA will decrease after a couple of years of operation, but continuous support will still be needed also over longer time for guaranteeing the long term sustainability of the community based management model of decentralised water systems. Continuous support is needed for following reasons:

- Change of staff requires new training and renewals of skills
- Changing legislation may require adaptation of the management model and WCA may not be able to handle this by themselves
- Necessary extensions or renewal of infrastructure may require increased external support
- On-going exchange with peers and training opportunities are needed to maintain the skills and level of performance of staff

Obviously a project like ApaSan with a limited duration cannot provide such post project support to all its current and former partner communities on the long term. Therefore, ApaSan explores ways to institutionalise support for WCAs, preferably within structures already existing in Moldova.

2.7 Information, training and coaching

Overview

In most cases of newly established WCAs, the staff has no prior experience in managing a water system. Also the WCA members have usually little prior experience in exercising the role of decision making and control in a community organisation. Providing good information and sufficient training to the actors of the WCA at different important steps of the implementation of the project and in the operation face is therefore very helpful for achieving a good start up and sustainable operation of the system.

Information, training or coaching should be provided during several key moments of the implementation process:

- During the process of formation of the WCA detailed information needs to be provided to the WCA members for clarifying the process and the implications of the support, in particular members need to understand their rights and duties in the future WCA.
- During the start of operation of the WCA and the water system, WCA staff need to be trained and coached on the whole set of skills and tools needed to professionally manage and operate the water system
- After the completion of the implementation, periodical refreshment training as well as specific training addressing identified capacity gaps are needed to maintain good operation practice over prolonged time.

In the rest of this chapter, objectives and recommended units for information and training units or coaching are described.

Table 6: Focus areas and recommended units for information, training and coaching

Focus areas	Information, training or coaching units
WCA Governance	<ul style="list-style-type: none"> ■ Information on rights and responsibilities ■ Training on roles and tasks of members in WCA boards and audit commissions ■ Training and coaching on social inclusion
Planning	<ul style="list-style-type: none"> ■ Training on planning ■ Coaching to WCA staff on establishing plans
Accounting	<ul style="list-style-type: none"> ■ Training on accounting with 1C programme ■ Coaching of accountants
Operation, maintenance, monitoring	<ul style="list-style-type: none"> ■ Training on preventive maintenance ■ Coaching on monitoring

WCA Governance

Roles and responsibilities of WCA members, tasks of board and audit commission members

The WCA performance is strongly related to the good functioning of its governing bodies: the general assembly meetings, the board and the audit commission. These in turn depend on strong ownership and interest of members as well as of good awareness on their rights and responsibilities

Training on WCA governance therefore has the goal to make members recognising the value of active participation in the association. It aims in particular at those members elected to boards and audit commissions for them having the necessary knowledge on good practices of governance and planning that is needed to properly fulfil their role.

Information and training on WCA governance may include the following units:

- **Information on rights and responsibilities:** In the initial project phase, e.g. during the initial community meetings, community members should be provided with clear information their rights and responsibilities as WCA member and customer of the WCA.
- **Training on roles and tasks of members in WCA boards and audit commissions:** Training sessions should be provided to members of boards and audit commissions to reinforce the understanding of the importance of active governing bodies for the functioning of the WCA, to provide members with tools and good practice examples and a basic understanding of important processes in the WCA such as tariff setting procedures or budget planning.

Inclusion

The challenging issue of achieving better inclusion of socially vulnerable households to the water services can best be tackled by making WCA presidents and Mayors aware of the importance of the issue, making them understand their duties to support households in need, and helping them understand options for practical solutions.

Training and coaching on inclusion may comprise the following:

- **Training and coaching on social inclusion:** A general training session should be provided to Mayors and WCA presidents on the relevance of inclusion of vulnerable households to water services, on the duties of governmental institutions to provide support, and on practical measures and solutions. As the specific context and situation of socially vulnerable households may vary from village to village, it may be helpful to provide direct coaching to Mayoralties and WCAs for assessing the specific situation and come up with specific solutions.

Planning

Good planning is crucial for a sustainable operation of the WCA. It is therefore recommended to provide thorough training and coaching of WCA staff on all basic elements of planning needed in a small water operator: administrative planning, human resources planning, budgeting and tariff revisions, planning of operation, maintenance and monitoring, and long-term planning of assets renewal.

The goals of training and coaching on planning are that:

- WCA staff understand the importance of planning and recognise its value for their daily work
- WCA staff have the necessary tools for planning (e.g. sample plans) and know how to use them for conducting planning
- WCA have good plans and WCA staff know how to use them for their daily work

Units for training and coaching on planning may include the following:

- **Training on planning:** Trainings should be held for WCA presidents and staff and include information on the need of planning, an overview on all basic elements of planning, and introduction to planning tools.
- **Coaching to WCA staff on establishing plans:** During the initial phase of operation, WCA staff should be coached by an expert on water utility management, who directly works with WCA staff on establishing all needed plans, with the result being that WCA have a complete set of plans.

Accounting

Good standards in accounting, billing and debt management are key for assuring revenues of the WCA and to provide the necessary data for management and planning. Training of accountants is recommended to prepare them with skills and tools needed for accounting in a water service provider and a community organisation.

Training units on accounting may include the following:

- **Training on accounting with 1C programme:** Accountants are trained in the use of computers in general, as well as in the use of the 1C programme (accountancy software adapted to the needs of WCAs).
- **Coaching of accountants:** During the initial phase of operation, or in WCAs that have specific problems with financial management, WCA staff should be coached by an expert on establishing or improving the general state of accounting in the WCA, introducing procedures for debt management, financial monitoring, calculations for tariff revisions, etc.

Operation, maintenance and monitoring

Skilled technicians are fundamental for providing water services on a daily basis and for maintaining the infrastructure in good status on the long term. They need to understand their water system, ensure systematic and continuous operation and maintenance, and be able to monitor operational performance. However, also the presidents need to have a good understanding of the implications of operation and maintenance, in particular of the value of preventive maintenance for sustainability of the system and cost efficient operation. The aim of training and coaching to WCA staff is to equip them with all skills and tools needed to fulfil these functions.

Training units on operation, maintenance and monitoring may include the following:

- **Training on preventive maintenance:** A training unit on the principles and practical tools of preventive maintenance should be provided to presidents and technicians.
- **Coaching on monitoring:** During the initial phase of operation, or in WCAs that have specific performance problems, WCA staff should be coached by an expert on implementing the established plans for operation and maintenance works, as well as for applying the required tools for monitoring water quantity and quality in the system.

Part 3 Annexes

The following list of annexes contains templates, examples and any kind of documents that can be useful in the implementation of decentralised water supply systems. The documents listed below were mentioned in footnotes in the text of the previous chapters.

All annexes can be downloaded from the following website:

<http://apasan.md/documents/15>

This website will be continuously updated, some of the documents listed below will be updated or improved, and additional documents will be added over time.

Title
Cartea tehnica / Logbook for construction works
Description of the WCA registration procedure
Decision 934 on water quality requirements for drinking water
Example of a concession contract between a LPA and a WCA
Example of a contract for the construction of a water supply system
Example of a contract for the technical design of a water supply system
Example of a cooperation contract
Example of a donation letter from ApaSan to LPA
Example of a job description of a WCA accountant
Example of a job description of a WCA technician
Example of a service delivery contract between WCA and water consumers
Example of a water bill
Example of an annual WCA budget
Example of an operation, maintenance and monitoring plan
Example of annual report of the audit commission
Example of annual report of the WCA president
Example of cooperation offer of ApaSan for support for establishing community managed water supply systems
Example of internal regulations of procedures in a WCA

Example of inventory list of WCA assets
Example of minutes of a board meeting
Example of minutes of a general assembly meeting
Example of minutes of the final reception
Example of minutes of the reception of finalised works
Example of statutes of a WCA
Example of tender documents for the construction of a water supply system
Example of tender documents for the design of a water supply system
Examples of billboards at WCA offices
Instructions for building the chamber for a household connection
Format for recording of household meter readings
Law Nr. 837 on public associations
List of documents that have to be present in a WCA office
List of equipment needed in a WCA office
Monitoring forms for recording interventions, evidence of services provided to WCA members, recording of rainfall, recording of water flows into reservoirs and networks, calculation of water balance
Progress checklist about payments and construction of connection chambers
Project management system for quality assurance in the construction of water supply projects
Reference plans of a pumping station
Reference plans of a reservoir
Reference plans of a spring catchment
Regulation on the organisation and operation of public water services
Spring Catchment, Series of Manuals on Drinking Water Supply, Skat, 2001
Template for an annual WCA budget
Template for minutes of meetings of weekly construction site meetings
Template of accounting policy
Template of annual WCA financial report to authorities
Template of annual WCA financial report to members

In 10 years of successful cooperation between Switzerland and Moldova, rural communities in Moldova have been supported with the construction of decentralised water supply systems.

These new water supply systems use springs located close to the villages and distribute the water through a pipe network to the households of the community. The systems are managed by community based organisations. Such decentralised and community managed water supply systems have proven to be very successful in providing sustainable water supply for rural communities. This approach therefore merits wider application throughout rural Moldova.

The aim of the guidebook is to make this experience available, with the hope that it is used to implement more systems that provide better and lasting water supply services for the rural population in Moldova.