



D.T3.4.3 - NATIONAL LEVEL POLICY RECOMMENDATION FOR HUNGARY

DISCUSSION PAPER

BUDAPEST FUA

Final Version
11 2021

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INTRODUCTION

The City Water Circles project aims to examine the challenges of urban water management in the context of climate change and to offer solutions.

The project's policy analysis and recommendations will examine areas where national regulation and changes to existing rules and practices can intervene effectively, and will make recommendations for such possible interventions.

Our policy recommendations are intended to assist decision-makers in their work and to provide a basis for an interdisciplinary dialogue on the options for circular urban water management.



1. Collecting Relevant Data, Defining Existing Gaps, Key Stakeholders and Enablers

1.1. Step 1 - Mapping

1.1.1. Questions to be addressed:

- What policies are currently enacted addressing water recycling and what is the content?

A strategy for the utilization of used waters (wastewater) has existed in Hungary for decades. In the past, attempts have been made to complete the actual, low efficiency wastewater treatment. In this process, the agricultural use of the nutrient content of the wastewater was planned as an increase in the treatment efficiency, but this has been reduced due to the unfavorable change in the quality of the wastewater (risk of the appearance of chemicals and toxic substances). There was considerable public dislike for the utilization of wastewater.

Due to aversion, as well as technical and public health considerations, the recycling of treated wastewater into the environment without harm seemed to be feasible. The water treated at the wastewater treatment plants enters primarily natural water bodies. The scope of direct re-use of treated wastewater is limited by legislation to agriculture for public health reasons. Recycling for agricultural purposes was regulated by a government decree in 2001. Recycling of treated wastewater has been refocused due to climate change. An important element of the National Water Strategy - Jenő Kvassay Plan - which is about to be adopted -, is to increase the proportion of recycled water and water efficiency.

Although the National Water Strategy - Jenő Kvassay Plan refers to the recycling of in-house gray water, and there is only one reference in the legislation according to the current situation, detailed rules have not been developed in Hungary yet, but it will be demanded in the next decade, following the European trends.

- What policies are currently enacted addressing use of rainwater, stormwater runoffs, water scarcity alleviation and what is the content?

The rules for stormwater drainage and water scarcity are based on the adoption of a policy formulated by the European Union. Following the accession to the EU in 2004, the directives that have been formulated in EU policies, in particular Directive 2000/60 / EC (Water Framework Directive), have become the basis for local regulation.

There are currently no definitive legal requirements for addressing water scarcity in the context of climate change, but there is a number of publicly funded research aimed at improving resilience to the effects of climate change, especially in times of water scarcity.

At the same time, there is a lack of regulations on municipal stormwater management and water scarcity, increasing the resilience, which would provide guidance to law enforcers and the public in specific cases.



- What laws and regulations, if any, are governing (recycled) water reuse (general standards, intended use-related standards) and what is the content?

Legislation on the reuse of water is primarily aimed at the reuse of treated wastewater. Although such initiatives have existed in the past, the development of the current legal framework can be observed in the legal system since 2001. In the past, attempts have been made to complete the wastewater treatment. It meant the exploitation of the nutrient content of wastewater was the principal target, but it was also reduced due to industrial (the difficult to control small-scale industry, first of all) and domestic chemical pollution. The population also refrained from using wastewater in food production, so the use of wastewater was mostly limited to the production of industrial raw materials and energy. Changes in the production conditions of agriculture with the fragmentation of large cooperative farms also had an adverse effect on the use of direct or partially treated wastewater.

The current basis for water recycling is Act on Water management LVII of 1995, as amended several times. The Section 4 (1) (b) and Section 44 / B of this Act, waste water is generally collected and treated at municipal or regional, centralized wastewater treatment plants. If no drainage system is available, the waste water must be transported to a sewage treatment plant.

An alternative is the use of domestic wastewater treatment plants in the disposal and treatment of sewage. Domestic wastewater treatment is an additional solution if there is no drainage on the site (lot) where the waste is discharged, or the connection between the property and the realized sewer is disproportionately expensive. The rules on domestic wastewater treatment are laid down in the Decree of Government No. 72/1996 regulating the exercise of the authority of the water management offices, (V. 22.) in § 24) (1), (2), (4). This solution can be only temporary under current regulations, despite the fact that many compact small appliances are commercially available. Under current regulations, individual domestic treatment plants must be shut down when the public sewer becomes technically accessible and, of course, a number of technical rules must be observed in the design and operation of each treatment plant, as for water recovery, protection and remediation activities and facilities, so it is fixed in the § 2-7-9, as well as § 20, bb), be) and § 24-28 of Government Decree 147/2010 (V.29).

No rules have been developed for the recycling of in-house gray water in Hungary, but there will be a demand for this in the next decade based on European trends. This is indicated by the National Water Strategy - Jenő Kvassay Plan, as well as the current 253/1997. (XII. 20.) Government Decree, which contains the national urban planning and construction requirements; 56 / B § c) point of this Act mentions the use of gray water, without more precised regulation, as a sign of purpose.

The water treated at the wastewater treatment plant enters primarily natural water bodies. Legislation restricts the scope of direct reuse of treated wastewater to agriculture, primarily for public health reasons. Recycling for agricultural purposes was regulated by a government decree in 2001 (Government Decree 50/2001 (IV.3. On the rules for the agricultural use and treatment of sewage and sewage sludge).

The legal environment is currently designed for centralized wastewater treatment at the municipal or regional level, and the rules for the costs of wastewater drainage and treatment have been developed accordingly. The Government Decree 58/2013. (II. 27.) was issued to regulate the details of the rules inacted in Act. No. CCIX of 2011 on water utility services; if there is no separate meter to measure wastewater discharge, the basis for the payment of the sewage drainage and treatment is the amount of consumed



drinking water; thus the measurement of wastewater emissions is not mandatory. The measurement of the amount of wastewater can be applied at the discretion of the consumer, if due to the nature of water use the amount of consumed water differs substantially from the amount of discharged wastewater, the installation of the meter can be proposed by the consumer. This is especially useful in the case of non-residential use if the water is incorporated into a product, or during technology e.g. evaporates and does not appear in the effluent discharge. However, this rule also obliges the consumer to ensure that water from a non-piped utility network is measured if it appears in the wastewater and no separate wastewater meter is installed. The regulation seeks to settle the issue in such a way that the payment of fees really only applies to the water consumed and the wastewater discharged. As wastewater emissions are usually measured by induction or ultrasonic methods, the measurement requires electricity, data is recorded digitally, etc., so it is more expensive than a standard drinking water measurement, so it is not yet widespread at the household level. If the consumed piped drinking water is reused, the effluent discharge will not change; Thus, the use of gray water does not require the introduction of measurement. The recycling of in-house gray water is not regulated yet in Hungary, but following the regulatory tendencies of other EU countries it is expected to take place in the coming years (National Water Strategy - proposed by the National Water Authority). The reuse of gray water is only regulated by No. 253/1997. (XII. 20.) Government Decree on the national town planning and construction requirements (Section 56 / B c): efforts should be made to utilize gray water.

- What laws regulations, if any, are governing rainwater collection and what is the content? What policies, if any, are governing the stormwater runoffs into the sewage system and minimisation of their negative effect on wastewater infrastructure and what is the content?

Rules for stormwater drainage and water scarcity management are based on the Act LVII of 1995 on Water Management. Furthermore, there are other related laws and decrees that ensure the management of the issue, such as the delimitation of tasks with regard to the prevention of water damage and the protection against water damage (Act on the Municipalities in Hungary, CCIX of 2011). The rules for the discharge of rainwater in combined sewers are laid down in Act CCIX of 2011 on water utility services. In general, it can be stated that the prevention of municipal water damage is the responsibility of local governments.

The drainage of rainwater in the communities is taken place either by rainwater drainage ditches, bonification channels and small watercourses, or by drainage utility networks. In the case of utility networks, the drainage of rainwater is provided by the rainwater channels of the separated systems or the combined sewers. In the current legal environment, the rules regulating the details of maintenance and costs have only been developed for sewage systems, according to the Act No.2011 CCIX. The essence of this is that no rainwater can enter the sewers of the separated system, it can enter the combined system only; in the case of the latter, the costs of stormwater drainage must (can) be provided together with the wastewater charge. As in the case of separate systems no precipitation channel was built in a significant parts of networks, the number of illegal stormwater connections is high enough, it causes flood damages and also the regular overloading of sewers and pumping stations is quite frequent, so the interruptions of wastewater treatment can occur, as well.

The legal framework of rainwater treatment is incomplete, contradictory and does not fit to the actual practice. The falling rainwater belongs to the person on whose property it



falls, as defined in Act LVII of 1995 on Water Management. Section 6 (4) states, so the recovery and damage prevention related to the rainfall is the right and duty of the landowner. There are some specific limitations in this issue, e.g. rainwater shall not be discharged from the plot into public or other areas beyond the rules referred to in the preceding paragraph. This rule does not take into account whether the geographical characteristics of the property (soil's seeping capacity, built-in ratio, slope, etc.) make the property suitable for collecting and storing rainwater.

There are currently no definite legal requirements for dealing with lengthening water scarcity periods related to climate change; the provisions essentially outline principles but do not provide clear guidance. Beyond the ban on admission of rainwater to municipal lots, no provision addresses the issue of the rainwater's use. The situation is similar with the use of runoff reduction tools. Although, climate targets include the retention, detention and use of rainwater, only in Act No. 253/1997, which sets out the requirements for town planning and construction, is one where a rule can be found in Annex 5 which provides a method for calculating the compensation rate of green roofs when including them in green areas, for determining all the buildable areas. As stormwater management is the responsibility of local governments under the Water Management Act, this legislation, if interpreted in a permissive way, gives local municipalities more freedom in the local regulation and adoption of these sustainable stormwater management solutions. On the other hand, if we take the Hungarian static legal interpretation traditions as a basis, the actors see in the undescribed possibilities rather the danger of liability, on which investments or measures cannot be based.

- What laws and regulations, including municipal, regional or national spatial planning acts, are enacted and the content of said governance regarding ensuring green permeable surfaces, limiting the soil sealing index, green roofs etc. Are there any new policies, laws or regulations foreseen to newly address these issues?

The number of legal regulations affecting the runoff is low. In the hierarchy of legal rules, the issue appears in the in Annex 5 of the Government Decree No. 253/1997 on urban planning and construction requirements. Here, the method and possibility of offsetting in green area proportions appear primarily. The selection of the technical solutions from the toolkit of best practices is the responsibility of the designers, depending on the cost sensitivity or environmental awareness of the client.

The issue of permeable coverings is also controversial. Although pavements are considered to be permeable, in practice a thick layer of concrete is most often used under the pavement to increase the load-bearing capacity. This solution eliminates the water absorption capacity of the upper layers of pavement. As load-bearing capacity is an important consideration for pavement. Low load-bearing layer could only be implemented in pavements with low traffic loads, such as pavements designed for pedestrian and bicycle traffic, occasionally used driveways or car parks. So far, alternative, water-permeable and load-bearing structures have not become widespread in practice, except for the cobblestone paving of monumental (old-town) city centers, for which tenders have the opportunity and resources for a more modern but costly solution.

According to the actual practice, even low-load surfaces of garden driveways are currently built using a concrete load-bearing layer, as the soils in Hungary are sensitive to water in many cases, and damage of pavement can be prevented economically in this way. Other technical solutions, such as the production of foam cement road base, which is both heat and water insulating, is not profitable on small surfaces.



Local building codes may cover details that may ensure rainwater seepage and retention when designing roofs and coverings of terrain. The occurrence of these solutions is occasional, depending on the attitude of the architects who draw up the municipality's building regulations and the utility engineers who work with them, as well as the politicians who accept the plans.

On this issue, progress is expected at the municipal and planner's level as a result of awareness-raising work and through a more specific legislation. A change in this sense is expected at the level of legislation (estimated) over a period of 5-10 years.

1.2. Step 2 - Comparative View

1.2.1. Questions to be addressed:

- Are the policies comparable to other EU countries, as reported by other project partners?

Hungarian water policy is developing in accordance with the directives of the European Union. The pace of development depends to a large extent on the constraints that are reflected in the availability of water resources and water demand. Hungary is, in general, in a comfortable position with regard to water resources, as long as the available water resources are basically able to serve the water demand in the long run. Regions with water shortages in agriculture can be identified, spatially and temporally. This water scarcity may be exacerbated based on climate change projections, so surveying and regulating the condition of rivers and lakes to help retain water has begun. The National Water Directorate is continuously renovating the water-governing facilities and has also raised the standard design flood level. These elevation works will be carried out within two stages, taking into account local conditions and problems as well as the high cost. The water supply of the population will not be affected in quantitative terms by this change, given the infrastructure built and the source side of the water supply. In European countries where geographical fragmentation and a climate with extreme hydrometeorological characteristics have already threatened society with severe water scarcity, there has been greater progress on circular water use. This is especially true in the recent period, when EU funds made possible to implement water management developments in less-favored regions. In the better developed EU countries, where the renewal of infrastructure and the development of an environmental approach go hand in hand, similar developments can be observed, even if no significant shortage of water resources can be identified. (https://mta.hu/data/dokumentumok/Viztudomanyi%20Program/NVKP_20180331.pdf)

Hungary's situation is intermediate, which may justify the fact that no radical progress can be detected on the issue at the political level, for the time being.

- Are there any comparative research studies and what are their results?

We do not have specific data.

- Briefly assess the level of your national framework in comparison to other countries.

We do not have specific data.



- Is the EU regulation for water reuse already transposed into your national legislation, if not, when, if possible to determine, is it expected, or are there any other comparable standards?

The current rule (Regulation (EU) 2020/741 of the European Parliament and of the Council of 25 May 2020 on minimum requirements for the reuse of water) will enter into force after 26.07.2023. The domestic legislation in force is not yet late in this respect.

The standard MSZ EN 16941-1, non-drinking water supply systems utilizing at the place of origin, Part 1: Rainwater utilization systems, has entered into force, which can provide general guidelines in technical practice.

Compliance with Hungarian standards is not mandatory, but it is very important for economic operators in the specific field to be covered by the standard to comply with them, especially when settling disputes.

1.3. Step 3- Assigned Authorities

1.3.1. Questions to be addressed:

- Which authority is responsible for adoption of policies and strategies regarding water reuse and rainwater use?

Water management is the responsibility of the Ministry of the Interior, in the current public administration system. The Ministry of the Interior is responsible also for the water administration and oversees the municipalities, as well. As it was shown earlier, the legal framework leaves the issue of harvesting the locally generated water (rainwater) primarily to local governments (in more complex cases the acquisition of permit can be necessary), but in the case of wastewater, the reuse of treated water can take place on the basis of water management permits. Accordingly, there may be also central state and local policies at the municipal level regarding the reuse of water and the use of rainwater.

With regard to the use of rainwater, a separate category is water collected and used on private land. In this case, the owner's own decision is relevant; this decision can be based on three bases, such as state support framework (legal framework and possible financial support), the municipal incentive, and the owner's own beliefs. All three motivating forces rely heavily on the dissemination and lobbying activities of professional and scientific organizations as well as professional non-governmental organizations.

- Which authorities are responsible for proposition and adoption of water reuse legislation?

The shaping of the water management rules the role of state offices is appearing, but the motivating force of non-governmental organizations is more significant.

The role of the committees of the Hungarian Academy of Sciences is also significant, their activities can be initiated by themselves or by state-level policies or decisions.

A similar role is played by the National Water Directorate's Scientific Council, which is organizationally independent of the Academy and is the organization of the National Water Directorate, and is responsible for the scientific support of the full range of water management tasks and the development of relevant strategies.

The responsibility of NGOs, more precisely their impact, is stronger in municipal and private ownership decisions, as they interpret policy issues in a way that can be understood and grasped by the public.



The influence of the Academy and the Scientific Council is indirect, characteristically, as the NGOs try to promote the instant application of the results of the rainwater and grey water management realized in far countries, several times independently from the intention or opinion of the earlier mentioned organizations, but targeting basically similar aims. These organizations, in turn, have repercussions, like Vox Populi, they reflect the needs of the community. The interface between the public and civil spheres can be observed mainly in conferences and the non-professional press.

- Which authorities are competent to supervise the recycled water quality standards?

The control of recycled water is typically the responsibility of the environmental protection and public health departments organized under government offices, and the water management organization.

- Which authorities are competent to supervise stormwater runoffs in relation to burdening the wastewater infrastructure?

The hierarchy of competence for issues related to stormwater with sewage systems is as follows. For the operation of the system, the public utility company has responsibility. The utility service provider operating in the area is responsible for the operation of the system. If the utility service provider detects an anomaly related to rainwater discharge, it can contact three authorities, depending on the nature of the problem.

If a disaster (significant flood, danger to life, threat of epidemic, immediate need for water quality and life-saving intervention) is detected, the involvement of the territorially competent disaster management organization is necessary.

If there is a risk of damage due to significant illegal discharges of rainwater and the discharges are related to direct legal issues, the involvement of a water authority (merged into the Disaster Management Organization) is needed, which will mobilize the Water Directorate in technical matters to resolve the issue.

If the water utility provider notices the illegal discharge of rainwater into the sewer drain in a private-owned lot, an official procedure can be initiated at the Government Office, which will investigate and settle the matter through an official, and in case of review request, sends the case towards the court.

The involvement of a government office is necessary in all three cases, as a breach case typically arises, in which property protection and compensation issues are also raised, which can be initiated mostly with this authority.

- Which authorities are responsible for proposing and enacting spatial planning measures?

The making of urban development plans of the settlements are in the competence of the municipalities. At present, this power is weak, as the building permit cases have been delegated from the municipalities to the government offices, so the implementation of the town planning plans is not fully guaranteed.



1.4. Step 4 - Levels of Government

1.4.1. Questions to be addressed:

- What are the general competencies of national governments in relation to water reuse, rainwater use and stormwater runoffs?

The general task of the national government is to provide a legal framework in line with the state of the art on the field of water reuse and rainwater management, as well as the regulation of runoff. In Hungary, this is rather centralized, so special issues may be regulated at the level of government decisions and government decrees. The downside of this is that the government's scope for review on detailed issues is limited, it can take years for an issue to come before the government again and thus modernizing the regulation becomes a lengthy process.

- What are the general competencies of regional governments, if they are present in your country, in relation to water reuse, rainwater use and stormwater runoffs?

At present, Hungary does not have the large regional self-government known in several countries in Europe. Traditionally, there are county governments between local governments and the government, which currently operate with quite reduced powers.

- What are the general competencies of local governments in relation to water reuse, rainwater use and stormwater runoffs?

According to the current legislation, the responsibilities of local governments also include the prevention of water damage and the provision of protection against it. In accordance with this task, the right to apply the relevant regulations is available through settlement plans and other local ordinances and support programs. At the same time, the authority of issuing building permission has been taken away from local governments, and significant cuts in financial resources (local taxes and central government normative subsidies) have also been characteristic. Thus, the possibilities of local governments are not sufficient to perform the tasks set out in the law.

1.5. Step 5 - Prioritization

1.5.1. Questions to be addressed:

- Should there be a national water reuse and rainwater use (e.g. National water conservation strategy) adopted in your country?

There exists a National Water Strategy, which briefly mentions the re-use of water and the issue of rainwater use. So, there is therefore a strategy, but it can be stated that it is rather concise, it would be justified to elaborate the issue in more detail and outline the means of implementation necessary for its implementation.

- Which are the laws and regulations that provide a nation-wide framework for water reuse, recycled water standards, rainwater use, stormwater runoffs?

Among the existing laws, the laws on water management, local municipalities and water utilities should be mentioned, which could also provide a legal framework for water reuse



at the national level. There are also government decrees on local water damage, water utilization, irrigation, etc., these are also part of the national legal framework, as some - a smaller number - of ministerial decrees. These are the following:

- Act on Water Management, No. 1995. LVII
 - Act on Water utilities, No. 2011. CCIX
 - Act on the Municipalities in Hungary, No. 2011. CLXXXIX
 - 253/1997. (XII. 20.) Government decree on national urban planning and construction requirements
 - 147/2010 (V. 29.) Government decree on the general rules for activities and installations for the recovery, protection and remediation of water
 - 58/2013. (II.27.) Government decree on the implementation of certain provisions of the Act on Water Utilities No. 2011. CCIX
 - 72/1996. (V. 22.) Government decree on the exercise of water management authority powers
 - 253/1997. (XII. 20.) Government decree on national urban planning and construction requirements
 - 50/2001. (IV.3.) Government decree on rules for the agricultural use and treatment of waste water and sewage sludge
 - 221/2004. (VII. 21.) Government decree on certain rules for river basin management
 - 30/2008. (XII. 31.) order of Ministry of Environmental Protection and Water Management on the technical rules of activities and installations for the use, protection and remediation of water bodies
- Which acts (types and content) should be immediately adopted on the highest levels in order to ensure medium-term wider implementation of water reuse and rainwater use?

The necessary legal framework is existing, so the admission of new rules is not task presently, but the renewal of the existing norms is necessary, with special regards to the water re-use and rainwater management.

The relevant cornerstones of this issue are as follow:

Necessary to ensure a financial background for the rainwater management and operation of rainwater drainage systems together with carrying away the harmful excess water. The amendment of the following Acts is necessary:

- Act on Water Management, No. 1995. LVII
- Act on Water utilities, No. 2011. CCIX
- Act on the Municipalities in Hungary, No. 2011. CLXXXIX

Technical rules must be provided to enable the use of stormwater utilization solutions (already explored and used abroad); thus, the technical parameters of the solutions, the natural limitations of their application, etc. This requires amendments to the town planning rules and legislation on the prevention of water damage and the costs of using the water utility.

- 253/1997. (XII. 20.) Government decree on national urban planning and construction requirements
- 147/2010 (V. 29.) Government decree on the general rules for activities and installations for the recovery, protection and remediation of water



- 58/2013. (II.27.) Government decree on the implementation of certain provisions of the Act on Water Utilities No. 2011. CCIX
- 30/2008. (XII. 31.) order of Ministry of Environmental Protection and Water Management on the technical rules of activities and installations for the use, protection and remediation of water bodies

A framework should be provided to ensure a set of public health and technical conditions for the use of gray water, including liability issues. The regulation also requires the preparation of new legislation on this issue.

- Which sectoral acts and standards should be adopted enabling inter-sectoral water reuse (e.g. textile industry etc.)?

The creation of sector-specific legislation on the subject does not seem justified.

1.6. Step 6 - Existing Policy Support

1.6.1. Questions to be addressed:

- List the existing strategies and policies that you came across that should be considered in elaborating your national strategy and policies?

The National Water Management Strategy - Jenő Kvassay Plan contains an increase in the extent of grey water utilization, primarily in agricultural utilization. He mentions municipal stormwater management (retention, utilization and damage prevention) as a challenge.

The Second National Climate Change Strategy identifies the development of stormwater management and domestic grey water utilization as a short-term task.

The National Aquatic Research Program of the Hungarian Academy of Sciences highlights grey water as an additional source of non-potable water, although there is currently no water scarcity situation where the use of these sources in Hungary would be essential. He formulates the health, technical, economic and legal issues of the usability of grey water as a priority research task. The development of rainwater utilization among innovative and energy-saving water management methods is also a priority.

- List the key stakeholders / stakeholder groups that should be involved in the elaboration process.

The key players in policy development are:

Nationwide

- Hungarian Academy of Sciences
- National Water Directorate's Scientific Council
- Hungarian Chamber of Engineers' Water Management Department
- Hungarian Hydrological Society
- Hungarian Water Association (MASZESZ)
- Hungarian Water Utility Association (MAVÍZ)

At the local level



- Ad hoc committees of municipalities
- Non-governmental organizations involved in local issues
- List all other aspects that should be considered in preparation of such documents (economic, spatial, social etc.).

No other relevant aspects were found.



2. Targeted Analysis of Results

2.1. SWOT Analysis Assessing the Necessity of Adopting Water Conservation Policies, Laws and Regulations

STRENGTHS	OPPORTUNITIES
<ul style="list-style-type: none"> • Reducing the consumption of water treated for drinking water quality. • The use of domestic grey water (used water) can reduce the amount of water consumed by households. • Overexploitation of natural water resources can be reduced by utilizing grey water and rainwater. • Retaining rainwater reduces the load intensity of drainage systems. • Adaptation to the concept of circular farming. 	<ul style="list-style-type: none"> • Direct energy savings related to water consumption may increase. • The burden on the environment can be decreased by reducing the use of slowly renewable natural water resources. • • Peak loads on drainage systems can be reduced. • • Sensitizing the population to water management issues
WEAKNESSES	THREATS
<ul style="list-style-type: none"> • There is a lack of adequate legislation on the use of rainwater and gray water. • The existing decision-making and regulatory hierarchy is too long and therefore the effectiveness of tackling local problems is limited. 	<ul style="list-style-type: none"> • The unit cost of producing drinking water quality running water may increase. • The cost of maintaining the sewer drainage system may be reduced. • An increase in travelling time of water in pipes may rise the risk to public health of existing drinking water supply systems. • • The technical and public health adequacy of systems designed for higher water consumption may decrease. • • The use of grey water can pose a risk to public health. • • Long storage of rainwater can cause a water quality problem.



2.2. PESTLE Analysis Assessing the Necessity of Adopting Water Conservation Policies, Laws and Regulations

POLITICAL ISSUES	ECONOMIC ISSUES
<ul style="list-style-type: none"> • <i>Compilation of detailed strategy for water recycling.</i> • <i>Decentralization of the hierarchy of state and municipalities to change it suitable to water reuse.</i> • <i>Further development of legal framework to promote water recycling.</i> • <i>Appropriate adaptation of the legal environment of water utility systems to ensure the sustainable operation of the affected utility systems.</i> • <i>The coverage of maintaining and operating water utility systems costs need to be managed</i> 	<ul style="list-style-type: none"> • <i>The issue of the increase in the specific fee of drinking water due to the decrease in water consumption.</i> • <i>Costs of water quality aspects of a pipeline network that becomes oversized due to a reduced water consumption.</i> • <i>Costs of treated wastewater recycling.</i> • <i>Costs and returns on the design of domestic grey water systems in existing and newly built buildings and facilities.</i> • <i>Rainwater utilization costs and returns at individual and community levels.</i> • <i>Analysis of stormwater drainage and utilization costs, ensuring the source side of the costs.</i>
SOCIAL ISSUES	TECHNOLOGICAL ISSUES
<ul style="list-style-type: none"> • <i>Demonstrate the benefits of water recycling.</i> • <i>Introduce and promote household and community water recycling solutions to the citizens.</i> 	<ul style="list-style-type: none"> • <i>Look for solutions to ensure standard water quality in drinking water systems with lower water consumption.</i> • <i>Find solutions for the safe use of domestic grey water from a public health point of view.</i> • <i>Development and adoption of building services solutions for the use of domestic grey water and collected rainwater.</i>
LEGAL ISSUES	ENVIRONMENTAL ISSUES
<ul style="list-style-type: none"> • <i>Modernization and widen of legislation related to the recycling of treated wastewater.</i> • <i>Legal regulation of the safe use of domestic grey water.</i> • <i>Development of legal frameworks ensuring the economic sustainability of stormwater drainage systems, transformation of existing legislation.</i> • <i>Decentralization of the procedure for assessing and measuring in cases of illegal discharge of rainwater into a separate wastewater system; delegating these kinds of issues to the local municipality with the necessary (effective) sanctioning</i> 	<ul style="list-style-type: none"> • <i>Review rules on the reuse of treated wastewater to promote safe recycling.</i> • <i>Development of a system of environmental regulations for the quality of domestic grey water</i>



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3. Policy Recommendations

<p>Issue: <i>Compilation of a detailed strategy for the reuse of water</i></p>
<p>Recommendation: <i>Water uses that require non-potable drinking water quality should be reduced in order to avoid overexploitation of natural water resources and to reduce the energy demand for water treatment and supply to consumers.</i></p>
<p>Rationale: <i>During the development of water supply, the primary goal has been to provide consumers with healthy drinking water. This goal has been achieved in Hungary, almost 100% of the population receives piped water supply, the quality of piped water meets the requirements of the standards in most of the country, and improvements are only needed to meet the stricter health protection regulations. However, purifying water and delivering it to consumers is an energy-intensive process. Reducing the energy demand of water supply is a reasonable goal. The energy demand for water treatment also depends on the quality of the naturally available water resources. If, due to the overexploitation of natural water resources, it is also necessary to include less good quality water bodies in drinking water production, the amount of energy spent on treatment should also be higher. If the amount of water supplied to consumers on the pipeline can be reduced, the use of natural water resources will also be less necessary. Thus, the reduction in consumption demand results in a reduction in energy demand and a better management of water resources.</i></p> <p><i>One way to reduce consumption needs is to promote the safe reuse of water that is already used by the consumer for activities that do not require drinking water quality. This can also be helped by providing the necessary amount of water from alternative sources for such activities, such as collected rainwater. This is particularly important if the drainage of rainwater in the area is not solved and, for example, through illegal discharges, they cause overloading of the separated sewage system and thus material damage.</i></p> <p><i>A strategy needs to be formulated on this issue, outlining objectives in the short and medium term. These goals are the milestones that ensure that the goal is achieved through legislation and standards, aids, and awareness-raising work.</i></p> <p><i>Currently, several strategic documents are available to decision-makers, but they only address the set goal at the level of mention, so they are able to perform their function with low efficiency. A more detailed strategy, which also identifies milestones on the road to the goal, is essential.</i></p>

<p>Issue: <i>Decentralization of the relevant state and municipal hierarchy relevant in the issue of the water reuse</i></p>
<p>Recommendation: <i>There is a need to establish a public administration framework that addresses the issue of water recyclability at the local level by delegating authorization, control and sanctioning powers to the responsible local governments, shortening decision-making pathways.</i></p>
<p>Rationale: <i>The issue of water recycling is a matter of national importance, which, however, can typically take place at local level. Economical and efficient water management can be ensured for utilities and end users. From the point of view of circular economy, the end user, the consumer, is a</i></p>



relevant participant in this process. The consumer is typically an individual, or a group of individuals (e.g., condominium owners), or business entities; all of these can be achieved directly within a given community, and community goals can obviously be managed at a hierarchical level appropriate to the community. The provision of piped water supply, although implemented through public utility companies, is basically the responsibility of the municipalities according to the Hungarian legal system. This also means that saving water is also a local interest and thus obviously a local task, even if the protection of water resources is often a national matter.

The decentralization should take into account the two-tier local government system of Budapest. Share of tasks and competences needs particular care in the system.

A chapter dedicated to Circular Urban Water Management should be a required part of the urban strategic planning documents. The general methodology of Integrated Urban Development Strategy can deliver the frames and requirements.

Tasks related to water damage are also the responsibility of municipalities; this applies in particular to water damage (inundation) in connection with precipitation. Efficient water management at the building or consumer level can best be ensured by the building permit procedure and the related authority powers. Examples include dealing with damage in connection with the illegal disposal of rainwater, locating the person responsible and sanctioning it. In the present system, the building permit is issued in a higher administrative level, moved from the local governments in the past decade, and in some cases, only a notification is required for the construction. Higher administrative units have little understanding of local problems, so local interests are not necessarily visible, although these are necessary for sustainable water management, and so these aspects are not adequately reflected in their decisions. The situation is similar with sanctions; if, for example, someone causes damage by dumping illegal rainwater, it could be remedied through a government office process instead of a faster local procedure. At the same time, the essence of the problem is lost in the government office, because it is handled together with hundreds of cases directed to concentrated administration. This procedure results in a prolongation of the process, becoming impersonal and a loss of substance. The result of the procedure is not efficient enough in this system.

In order for the system to work properly, subsidiarity can be an effective solution, as enshrined also in European Union documents, as a way of tackling problems on the ground.

Issue: Further develop the legal framework to promote water recycling.

Recommendation: Legislation on water recycling needs to be modernized and it should be supplemented by detailed rules on the way grey water and rainwater are used.

Rationale: The current legislation allows the reuse of water in the specific case of wastewater treated at a wastewater treatment plant. The relevant legislation entered into force in 2001. Over the past 20 years, the need for grey water and rainwater management has also been mentioned in national strategies based on knowledge of water resources management and climate change. Neither the legislation mentions the management of grey water nor the way in which rainwater is utilized. If there is no legal regulation on technical solutions and their limits, there is uncertainty in decisionmakers and officials who apply the rules, which hinders their development. If the use of drinking water is not replaced in areas (industries and local utilizations) where the use of water below the drinking water standard would be appropriate, the community will be damaged obviously. Therefore, it is necessary



to support the recycling of used waters and the proper utilization of rainwater at the legislative level.

The decline of water consumption in recent years causes raised needs of maintenance and reconstruction of the water and sewage network. Further decrease risks the operation of the sewage system, reasonable water supplement is necessary.

Designers, authorities and users need new standards in technical design of water infrastructure tailored to the changed parameters.

Accurate measurement with standardized metering of wastewater is the basic condition of water reuse in buildings, even in case of greywater or rainwater.

A standard methodology of circular water management in strategic planning of settlements (e.g. Integrated City Strategy) can help the municipalities to identify the local problems and find solutions.

The local micro-environment aspects, like precipitation, bedrock, soil, topography, vegetation etc. should be taken in account in the local strategic planning and technical regulations.

Issue: *Appropriate adaptation of the legal environment dealing with water utility systems to ensure the sustainable operation of the relevant utility system.*

Recommendation: *It is necessary to amend the legal framework for the operation of water utility systems so that rainwater drainage systems are also considered to be water utilities.*

Rationale: *Separate system stormwater drainage ditches and their facilities do not fall into the category of water utilities under current legislation. The financing of the stormwater drainage system was solved only in cases when the rainfall was discharged into the combined sewerage system. As is well known, despite of the advantages of a combined system, it has a number of disadvantages, such as the management of overloads. In the case of such systems, the rainwater mixed with the wastewater can cause a significant overload in the wastewater treatment plant, so that through the overflows and bypasses, the contaminated water enters the natural water bodies without treatment after extreme showers. In the case of extreme showers, the overload results in flooding at pumping stations or hydraulically narrow parts of the sewerage system, faecal contaminated water can flood the inhabited settlements in the case of the combined canals, which poses a threat to public health. In the case of separated systems, this danger does not pose a threat (only in the case of illegal stormwater connection). The current regulation has resulted in sewers always having a designated operator with the necessary professional experience and equipment to carry out their task, providing a basis for the residential sewage treatment fee to cover the costs incurred. In the case of stormwater drainage channels, the “consumer” is typically the municipality, there are no other fee payers, so the maintenance of the system depends on the actual budget of the local government. As these financial resources have dwindled in the last decade, the amount of money that can be spent on the operation and development of stormwater drainage has also decreased.*

The classification of the storm sewer as a public utility could make it possible to collect the costs of maintenance and development of the systems in a similarly to the sewage system and would provide the municipalities with the professional background already established by the water utility companies for the sewerage systems.

Issue: *“Water Certificate” - mandatory national level building requirements on circular water*



<i>management for new private and public buildings and labelling of existing buildings</i>
Recommendation: <i>Elaborating technical standards of water management for new buildings and a water labelling system for existing and new buildings</i>
<p>Rationale:</p> <p><i>There is a huge potential in water consumption and water management of existing and new buildings. The private and public buildings play key role in the urban water management.</i></p> <p><i>The Energy Performance of Building Directive shows a good example of the market impact of technical requirements.</i></p> <p><i>Mandatory standards of water consumption, water reuse and rainwater management improve the sustainability of new building stock from the introduction point of new regulations.</i></p> <p><i>Labelling is a clear and easy to understand market tool with long term impact on the new and existing building stock. Buildings with sustainable water management represent a higher market value, thus it is a motivation factor for the private owners to invest in sustainable solutions, e.g. grey water reuse, green roof, rainwater tanks etc.</i></p>

Issue: <i>Direct and indirect incentives of circular urban water management</i>
Recommendation: <i>The Hungarian tax and price policies of water management should reward the sustainable solutions and sanctions the non-sustainable solutions. Beyond the tax and price policies, specific sectors need direct incentives to speed up investments.</i>
<p>Rationale:</p> <p><i>The current tax and price policies are not motivating to invest in circular water management. The tax and price policies of local and national authorities need revisions in aspect of water sustainability. Discounts for circular water management, nature-based solutions, water retention and reuse, low consumption solutions etc. Economic sanctions of non-sustainable water management e.g. penalty pricing of high consumption, sanctions of overbuilding are also necessary elements of the regulations.</i></p> <p><i>In specific sectors, like residential and municipal, the long financial return period and the lack of financial resources hinder the investments. These sectors need direct financial subsidies to speed up interventions.</i></p>

Issue: <i>Training education and awareness raising on circular urban water management</i>
Recommendation: <i>Extended local and national awareness raising programs for citizens training programs for municipalities decision makers business sector etc. upgraded educational programmes in public and university education.</i>
<p>Rationale:</p> <p><i>However, general public and decision makers are aware on climate change, the link to urban water management and solutions are still not evident. The raised level of knowledge on water problems sustainable solutions and its benefits ensures broad social support for implementation of circular</i></p>



urban water management in the public and private sector.

The circular water management is a must have principle in the educational programme of relevant universities and faculties. Designers and engineers of the future needs innovative approach and practical knowledge to be able to respond the challenges of climate change.

Human capacity building and specific knowledge of municipalities is a crucial aspect of circular urban management.

Review of National Curriculum for Schools in aspect of climate change and water management

Cooperation of water management companies and educational institutes (especially vocational schools) could help to relieve the lack of specialists on the market.

Interdisciplinary discussion between experts of different fields (technical financial law or social experts) supports to elaborate acceptable solutions for all stakeholders.