D.T3.3.2 FUA-LEVEL COLLABORATIVE VISIONS ON CREATING ENABLING LOCAL FRAMEWORKS OF CUW USE

Subtitle

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PREPARED BY

CONTENT

INTRODUCTION

Summary of chapters 1-5. The description of stage of local strategies on circular urban water management preparation covering vision creation, goal and objectives setting.

This document summarises the results of activities already carried out in the CWC project and relevant to the strategy building process. The first chapter of the document determines Bydgoszcz-Toruń FUA territory. The second chapter describes the stakeholders' involvement in the process of building the Strategy. The third chapter shows a baseline assessment: main results of survey of awareness, attitudes and behaviors related to the use of water by inhabitants Bydgoszcz- Toruń FUA and main challenges and strengths being results of Status Quo Assessment. Due to COVID-19, the second stakeholder meeting was held online. Probably this form of meeting was not conducive to interaction and stakeholder involvement in the meeting. The meeting could not be conducted as recommended by the COMMON GUIDE FOR THE FUA-LEVEL STRATEGY BUILDING PROCESS (D.T3.3.1) . The headings of chapters four and five are confusing because the vision and goals of the strategy have not been developed with stakeholders. Chapter four contains the message to think of water as a value. Chapter five summarizes the issues raised at the SGM2 that should be considered when building the strategy.

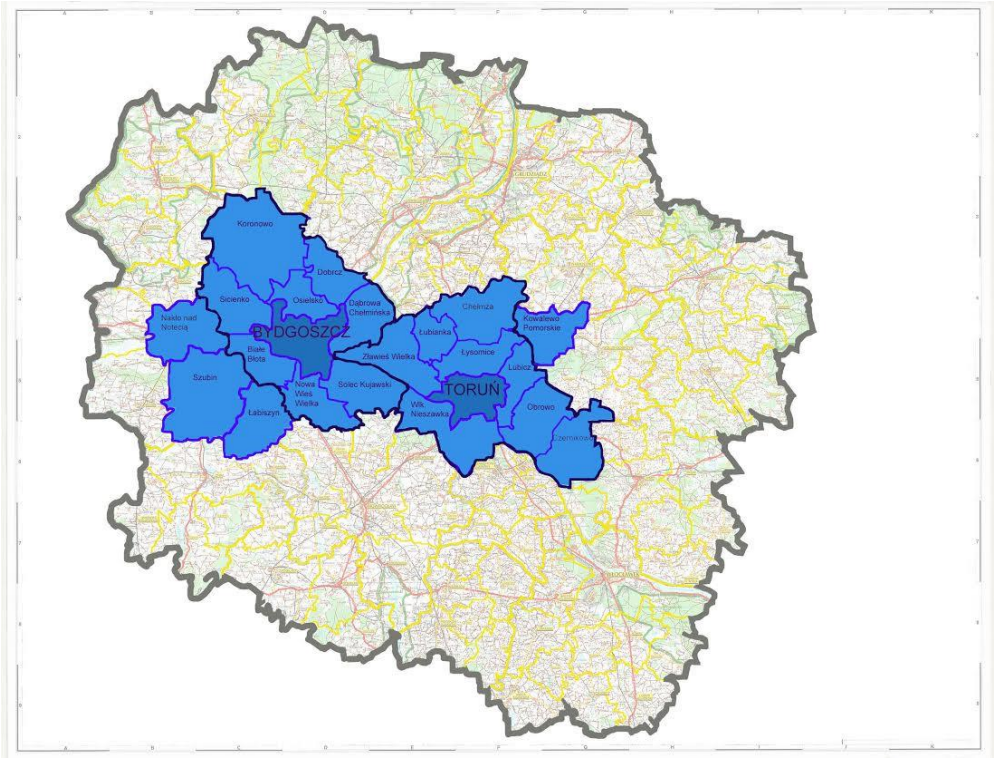
1. Determination of the territory covered by the strategy

Description of FUA as territorial unit.

The Bydgoszcz-Toruń Functional Area was determined on the basis of Resolution No. 15/463/14 of the KUJAWSKO-POMORSKIE VOIVODSHIP MANAGEMENT of 8 April 2014 on the designation of the area of implementation of Integrated Territorial Investments for Bydgoszcz, Toruń and the area functionally associated with them.

Bydgoszcz-Toruń Functional Area covers 23 municipalities:

1. City of Bydgoszcz,
2. Gmina Miasta Toruń,
3. Gmina Białe Błota,
4. Gmina Miasta Chełmża,
5. Gmina Chełmża,
6. Gmina Czernikowo,
7. Gmina Dąbrowa Chełmińska,
8. Gmina Dobrcz,
9. Gmina Koronowo,
10. Gmina Kowalewo Pomorskie,
11. Gmina Lubicz,
12. Gmina Łabiszyn,
13. Gmina Łubianka,
14. Gmina Łysomice,
15. Gmina Nakło nad Notecią,
16. Gmina Nowa Wieś Wielka,
17. Gmina Obrowo,
18. Gmina Osielsko,
19. Gmina Sicienko,
20. Gmina Solec Kujawski,
21. Gmina Szubin,
22. Gmina Wielka Nieszawka,
23. Gmina Zławieś Wielka.



2. Stakeholder involvement

The description of the stakeholders, and the way of their involvement in strategy building process.

The strategy building process requires the participation and cooperation of stakeholders who are either using the water or who are responsible for taking care of its individual elements via policy-making, legislation, regulation, infrastructure, water and wastewater treatment, etc.

Stakeholders are invited by City of Bydgoszcz to take part in the participatory strategy building process. Their important role is to co-design and verify local outcomes through their regular meetings:

SGM No. 2: Defining the BT-FUA vision until 2030; Setting goals, the implementation of which would result in the implementation of the vision

SGM No. 3: Development of a concept for an integrated circular water management strategy

SGM No. 4: Development of an Action Plan; Pilot Project; Analyses of the potential for the use of rainwater, gray water and treated wastewater (planed date: 05.2021)

SGM No. 5: consultation of the draft strategy and introduction of necessary amendments (planed date: 09.2021)

The 2nd stakeholder meeting was preceded by knowledge transfer training giving the opportunity to expand / acquire knowledge and build self-competence of stakeholders. Training was held on 24 and 25 of June 2020 via GoToMeeting platform (in webinar form). Day 1 was devoted to sustainable rainwater management. Day 2 was devoted to circular water management.

The 2nd stakeholder meeting held on June 7 and had online form (via GoToMeeting). 26 people participated in the meeting.

List of institutions participated in 2nd SGM:

1. Urząd Miasta Bydgoszczy
2. Urząd Miasta Torunia
3. Urząd Gminy Białe Błota
4. Urząd Miejski w Solcu Kujawskim
5. Biuro Zintegrowanych Inwestycji Terytorialnych dla Bydgosko-Toruńskiego Obszaru Funkcjonalnego (ZIT BTOF)
6. Państwowe Gospodarstwo Wodne Wody Polskie Regionalny Zarząd Gospodarki Wodnej w Bydgoszczy
7. Miejskie Wodociągi i Kanalizacja w Bydgoszczy
8. Zarząd Dróg Miejskich i Komunikacji Publicznych w Bydgoszczy
9. Uniwersytet Kazimierza Wielkiego
10. Miejska Pracownia Urbanistyczna w Bydgoszczy
11. Pracownia Architektury ATOR

1. City Council of Bydgoszcz
2. City Council of Toruń
3. Commune Office of Białe Błota
4. City Council of Solec Kujawski
5. Office of Integrated Territorial Investment on Bydgoszcz and Toruń Functional Area
6. State Water Holding Polish Waters Regional Water Management Boards in Bydgoszcz
7. Municipal Water Supply and Sewerage in Bydgoszcz
8. Municipal Road and Public Communication Authority in Bydgoszcz
9. Kazimierz Wielki University in Bydgoszcz
10. Municipal Urban Office in Bydgoszcz
11. ATOR Architecture Studio

3. Baseline assessment

The synthesis of quantitative and qualitative assessment. The data and analysis essential for creation a common vision together with stakeholders.

3.1. SURVEY RESULTS OF AWARENESS, ATTITUDES AND BEHAVIORS RELATED TO THE USE OF WATER BY INHABITANTS BYDGOSZCZ- TORUŃ FUA

There is a general awareness of the need to save water, many of the respondents use popular promoted water saving methods focusing mainly on individual habits, such as turning the water off or equipping bathrooms and kitchens with appropriate water-saving devices. This is motivated by both the environment and your own savings.

The respondents are also very open to the use of more advanced water recovery systems at the level of both the individual household and the entire city. They also favourably view the introduction of greenery to the city as a method of using rainwater (here on the example of green roofs). According to the survey results, it can be concluded that the respondents do not know the real values or the concept of water footprint.

As for the concerns of the respondents, they seem to coincide with the negative climate phenomena that have taken place recently. For example, in the minds of respondents, floods are considered to be a low threat, while torrential rains or droughts are considered a greater threat.

The respondents are aware that sustainable management of water resources is necessary and are open to changes and development in this direction.

3.2. FUA-LEVEL STATUS QUO ASSESSMENT RESULTS – MAIN CHALLENGES AND STRENGTHS

This part includes main challenges and strengths by 6 topics as summary of critical analysis of the FUA-Level Status Quo assessment results (D.T3.1.5).

1. Climate, Environment and population

▫ Challenges: Average temperature min. and max. is increasing, there is no data regarding the soil sealing in FUA.

▫ Strengths: Decreasing population living in the city and increasing population living on suburbs and villages, urban and build up areas consist of 7,7 % of the whole FUA , greenery on urban areas covers large part of the FUA (34,6%), percentage of green urban areas has increased since 2004.

2. Water resources

▫ Challenges: Very law annual precipitation in FUA 543,1 mm, most of rivers and canals has moderate and weak ecological potential.

▫ Strengths: Main river – Brda has good ecological potential, 81 000 m3 of water in water reservoirs, usable ground water resources are increasing.

3. Water infrastructures

▫ Challenges: There is no dual system water supply network within the FUA, no first flush rainwater collection technique implemented, no dual system wastewater collection network within the FUA.

▫ Strengths: Very good water tap quality, low percentage of loss in the water supply network in BTOF – 10,7%, high percentage of households and percentage of industries, connected to the wastewater collection network 79,9% and high percentage of population with access to the water supply network (95,1%).

4. Water consumption

▫ Challenges: High annual volume of freshwater extracted from the ground, surface water, other sources, no data regarding consumption of bottled water for drinking purposes on municipal or FUA level, no data of Falkenmark Indicator

▫ Strengths: Low consumption of mineral and spring waters, Initiatives of municipal waterworks in Bydgoszcz to promote drinking tap water, saving water, educational programmes: Bydgoszcz Water.

5. Climate change

▫ Challenges: Increase in value and number of days with maximum air temperature, in the length and frequency of heat waves and the growing phenomenon of urban heat island, flood hazard from rivers, drought resulting in water shortages in the region, Increase of frequency of thunderstorms with strong winds.

▫ Strengths: Modernisation and construction of rainwater system by Municipal Waterworks, Bydgoszcz Adaptation Plan to climate change by 2030 – numerous activities are foreseen to mitigate climate changes.

6. Rules, laws and good practices

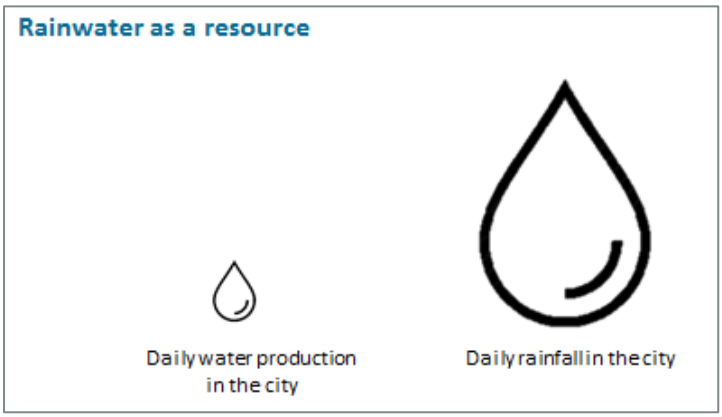
▫ Challenges: No legislation about dual water distribution system, water reuse, first rainwater collection. No rules about urban green spaces irrigation.

▫ Strengths: Promotion and education (leaflets, lessons for schools, information programmes in TV Woda Bydgoska, Bydgoszcz Adaptation Plan to climate change by 2030. Guideline for blue and green infrastructure (elaborated by Bydgoszcz waterworks).

4. Vision

The concise description of FUA's desired future state with suggested time horizon for the strategy 2030. The description of outputs of vision creating process (What visions were proposed by stakeholders? How was the joint vision chosen?)

The strategy's vision was not discussed during the second meeting with stakeholders. However, it was adopted as a principle, that water is a value. There are two sides of water: resource and utility (provides services). The strategy should aim for the artificial cycle of water intake, use and return to be as close to natural as possible; not to dispose of water, but to introduce to a cycle in which it will constantly circulate.



When talking about water in the city, we should remember about rainwater. On average, 3-4 times more water falls on the city per day than city produce it daily. We use little rainwater, in cities we try to get rid of it as soon as possible. A change of attitude is needed.

The motivation for action should be the appreciation that water in the city is a value.

5. Strategic goals and objectives

The list of strategic goals and relevant objectives (incl. indicators, state-value and tasks).

The basis for discussion with stakeholders about the strategy was the presentation entitled "Inspiration for the Strategy of Circular Water Management" prepared by Jacek Zalewski (RetencjaPL). The presentation covered the following topics:

- Strategy goal
- Key Issues
- Strengths
- Examples
- Barriers and tools
- Idea of "system of systems"

Below are the ideas that were submitted by the participants and the expert's suggestions on what issues should be considered when building a strategy and thinking about the water cycle in the city.

5.1. STRATEGY GOALS

Proposed goals of the strategy:

- Increase the city's resistance to torrential rains (which will reduce difficulties for residents resulting from torrential rains)
- Continue the idea of the sponge city, building the city's resilience with the use of blue-green infrastructure, solutions based on nature
- Identification of water resources broken down into supply and demand; first you need to determine the water balance
- Shorten the distance between the present situation and the long-term goals of tomorrow (closed circuit)
- Popularisation of the closed water cycle
- To make the artificial circulation we have influence on to the natural circulation in nature
- Introduction of a sustainable water cycle
- Limiting the water footprint
- Availability of rainwater for everyone, also in multi-family housing, so that each resident can use it

What should be the goal of the strategy?

In the planned time horizon, its effects should be visible, tailored to a given region, developing local aspirations, based on strengths.

5.2. KEY ISSUES

Criteria that should be followed when thinking about a closed water cycle are: how to use less? how to use multiple times? and how to recreate what we took to the environment?

1. Consume less:

- Reducing consumption in agriculture, industry, home, reducing the use of tap water for watering gardens; in industry: e.g. in the refrigeration cycle, use of washing wastewater, etc.
- Less energy consumption, less chemicals, reducing "additives"
- Deliver the same but with less water consumption; Can the same service be provided and how without the use of water (eg dry toilets); Do we really have to use water everywhere and in such quantities?

2. Use multiple times:

- Increase the value of water (the value of water is not only reflected in its price)
- Optimizing the recovery of energy and resources (e.g. nitrogen, phosphorus or other substances dissolved in water) from water (avoiding wasting energy irretrievably); When we think about a circular economy, we can think of the energy built into water used to supply or obtain water; saving and using

tap water many times, we save energy; cycle shortening (e.g. treatment of used on-site and re-use without the need to transfer waste water and take fresh water)

- Reuse of water and water-absorbing products; closed water circuits in industry
- The observed trend: moving outside the city (change of place of residence) and with the construction of a new house, the issue of expanding the water and sewage infrastructure appears, to shorten the circulation, you can use rainwater on the spot, use gray water;

3. Recreate the "base" (recreate what we took from the environment):

Protection of springs and catchments / protection of natural "capital"

Protection of the natural water cycle

Minimizing the impact on the environment; Quality of discharged sewage

Water management is currently linear, which can be illustrated as follows:

Consumption -> Usage -> Dump

Suggestion: think of a closed water cycle as a sum of microcycles. For each such microcycle, identify where the water is taken from, how it is used, where it is discharged and where we can recirculate the water so that the water circulates through the system as long as possible before we get rid of it.

Circulating water - where does it occur?

- In the ground; deep water intakes
- Air humidity - microclimate; in air
- In rivers and streams
- Lakes, ponds, ponds
- Other surface waters (melioration)
- Raw
- Treated - water supply
- Rainwater
- Greywater
- Sewage
- "Built-in" into products, food (water footprint); stored by plants
- Collected rainwater / rainwater
- Mineral water in bottles
- Wetlands, swamps

5.3. STRENGTHS

There are two sides of approach building a strategy: strengthening the strengths or eliminating the weaknesses of the system. It seems wiser to strengthen strengths. Questions can ask when analyzing the

strengths: What has happened in the last 30 years? What are we already doing well? What is already working well? Does water occur close to where it is used? Is the management system good?

The strengths of the current system that support the transition to closed-loop water management:

- A lot of green
- Not too high water charges, high compared to other communes
- Numerous water reservoirs, natural and artificial, natural watercourses
- In Toruń and Bydgoszcz, very good quality of tap water
- The self-assessment shows that water treatment and distribution are highly developed, most of the wastewater is treated, the quality of wastewater discharged into the water is high; water supply is not a problem (neither is sewage collection); low level of water losses both compared to Europe and certainly compared to other cities in Poland; low level of water stress; a system of prices for water and sewage is introduced; introduction of charges for rainwater; an area with little average rainfall
- Results from the opinion poll of residents: high awareness of water use, positive attitude of residents to saving water, 50% of respondents drink tap water
- Social campaigns / education, promotion,
- Catalog of green and blue infrastructure published by Miejskie Wodociągi i Kanalizacja in Bydgoszcz
- Bydgoszcz and Toruń have Municipal Plans for Adaptation to Climate Change, where water issues are a very important element

5.4. EXAMPLES

Bydgoszcz is implementing a project to modernize the drainage system and adapt it to retention and rainwater management.

Provincial Fund for Environmental Protection and Water Management in Toruń, as part of the Priority Program "Moja Woda", grants subsidies for the management of rainwater, natural persons who are owners or co-owners of real estate developed with single-family buildings may apply for funding.

The Toruń City Council adopted a resolution on the rules for granting a special-purpose subsidy for tasks aimed at the protection of water resources, consisting in the collection and use of rainwater and snowmelt at the place of their creation, implemented in the Toruń City Commune - pilot program for 2020.

In Bydgoszcz, on the Brda River, swimming competitions are organized (you can swim in the river in the city, it is an example of what can be achieved with the water quality class); care for the cleanliness of the river water brings economic and environmental benefits: water treatment is cheaper, uncontaminated water feeds the groundwater, and does not contribute to the pollution of the Baltic Sea.

In Toruń, a project will be implemented to drain rainwater from the roofs of the Kindergarten and Primary School to the existing reservoir, the so-called "Captain's Pond" located in a recreational area (collecting rainwater to supply ponds / reservoirs)

5.5. BARRIERS AND TOOLS

Key question to identify barriers: What are the obstacles to the transition to a circular economy?

Tools. Motivators to implement the strategy

- Water prices motivating economical use - strong stimulant / consumption reduction through prices
- Saving water must pay off
- Realization of water permits
- Balancing how much we use, we return water to the system
- Incentives / allowances, subsidies
- Education
- Dissemination of good solutions / promotion
- Gray water treatment systems are expensive which home builders do not opt for. The price barrier (technological), development of tools, systems making it cheaper; dissemination and promotion of such companies
- Tools that would guarantee / facilitate the introduction of gray water installations in renovated facilities
- For people migrating outside urbanized areas (areas without water and sewage infrastructure, water is taken from a well and sewage is discharged into a septic tank) - tools encouraging the implementation of solutions using gray water and / or rainwater

5.6. IDEA OF „SYSTEM OF SYSTEMS”

The inspiration for the Closed Circuit Water Management Strategy may be an idea taken from the document "Water and circular economy, White paper" by Arup, Anteagroup, Ellen McArturFoundation. This idea is based on the perception of the water cycle as a "system of systems", that is, the sum of systems, interdependent circuits.

What "small water cycles" can we identify? (according to the study):

- Water treated as a service
- Water as an energy source - in hydropower plants, as a heat store (we do not have batteries and water stores heat)
- Water as a transmission belt - a medium with the ability to move resources in the area of the environment (for use in agriculture)

Water as a service

Water provides services such as: sanitation in our homes and businesses, for cooling and heating our buildings, and as part of production processes in our factories. Water is often not fundamental to the service and the delivery of these outcomes can, at least in principle, be achieved by other means.

For example, water is ubiquitously used in evaporative cooling, but air forced cooling can achieve the same service outcomes but at lower energy efficiencies.

Water as source of Energy

Water, through its physical properties and how it can be utilized can act as a source of energy.

- The mass and momentum in the flow of water can be harnessed to generate hydro-electric energy.
- The thermal properties enable it to absorb thermal energy from the environment or human activity that can be extracted (e.g. water source heat pumps and energy harvesting from sewers).
- Bio-thermal energy such as anaerobic digestion from municipal sewage.

Water as a Carrier

As a liquid natural resource, water is a commonly available and universal carrier in the natural and built environment. In both contexts water is acting as a carrier of chemicals, particles and droplets (dissolved and suspended state) which represent potential resource or pollutant.

In agricultural settings, there is high potential of nitrogen and phosphorus from fertilizers to be present.

Within municipal and industrial settings, it could include trace chemicals in treated water and wastewater.

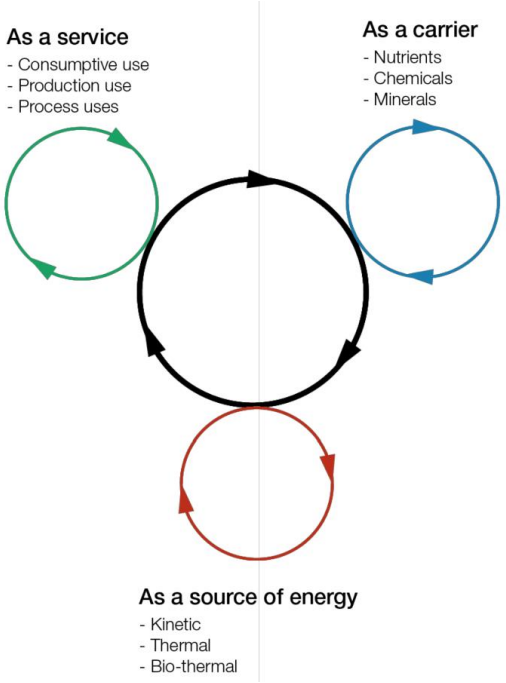
Removal of these chemical and nutrients may be driven by economic reasons, but in many situations it is driven (by regulatory requirements), for pollution prevention and environmental protection, e.g. recent limits on nitrate and phosphate being implemented in the European Union.

Extracting this nitrogen and phosphorus from final effluents at wastewater treatment plants before discharge provides these benefits:

Improves the quality of outflows to increase opportunity for water reuse and reduce cost of treatment for downstream users (e.g. for potable water treatment).

Reduces environmental impacts and enhances natural capital;

affords the opportunity of their use as fertilisers and enhance the Urban Bioloop potential.



Source: Water and circular economy, White paper by Arup, Anteagroup, Ellen McArturFoundation

5.7. SUMMARY

During the meeting with the stakeholders, the City of Bydgoszcz proposed that the strategy (the part concerning the vision and goals) would be general and targeted at the entire functional area, while the action plan would cover the activities of Bydgoszcz and municipalities that would like to do so. It was considered what area / area should be covered by the strategy and what issues it should cover. The following suggestions were collected:

- Focus on one circuit / issue and, using the region's strengths, resources, and awareness of the inhabitants, build a strategy for the entire area around a coherent theme. You can specify activities in

urbanized areas, as in suburbs, as in areas completely distant from the city, but we are still talking about the same topic. Territorial narrowing, e.g. to the city of Bydgoszcz, but covering all topics will be a very big challenge, and the strategy may disperse

- The BTOF area has different conditions than the city of Bydgoszcz. Each of the cities and municipalities is characterized by different soil and water conditions, hence the creation of one common strategy would be a great simplification. Common slogans, such as rational water management, yes, but the solutions for individual communes may be different
- Accessing and collecting data, monitoring and updating the strategy at the BTOF level will be a big challenge