



SCOREwater

Smart City Observatories implement REsilient Water Management

DELIVERABLE D4.1 ASSESSMENT OF BASELINE CONDITIONS FOR DEMONSTRATION CASES

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ABBREVIATIONS

Abbreviation	Definition
ICT	Information and Communications Technology
IoT	Internet of Things
SDG	Sustainable Development Goals
SME	Small and Medium-sized Enterprise
WP	Work Package





PROJECT ABSTRACT

SCOREwater focuses on enhancing the resilience of cities against climate change and urbanization by enabling a water smart society that fulfils SDGs 3, 6, 11, 12 and 13 and secures future ecosystem services. We introduce digital services to improve management of wastewater, stormwater and flooding events. These services are provided by an adaptive digital platform, developed and verified by relevant stakeholders (communities, municipalities, businesses, and civil society) in iterative collaboration with developers, thus tailoring to stakeholders' needs. Existing technical platforms and services (e.g. FIWARE, CKAN) are extended to the water domain by integrating relevant standards, ontologies and vocabularies, and provide an interoperable open-source platform for smart water management. Emerging digital technologies such as IoT, Artificial Intelligence, and Big Data is used to provide accurate real-time predictions and refined information.

We implement three large-scale, cross-cutting innovation demonstrators and enable transfer and upscale by providing harmonized data and services. We initiate a new domain “sewage sociology” mining biomarkers of community-wide lifestyle habits from sewage. We develop new water monitoring techniques and data-adaptive storm water treatment and apply to water resource protection and legal compliance for construction projects. We enhance resilience against flooding by sensing and hydrological modelling coupled to urban water engineering. We will identify best practices for developing and using the digital services, thus addressing water stakeholders beyond the project partners. The project will also develop technologies to increase public engagement in water management.

Moreover, SCOREwater will deliver an innovation ecosystem driven by the financial savings in both maintenance and operation of water systems that are offered using the SCOREwater digital services, providing new business opportunities for water and ICT SMEs.





SUMMARY

This assessment focuses on the potential stakeholders to the project SCOREWater. It focuses on describing organizations, their needs, abilities and conditions as well as their role and contribution to the project. Involved stakeholders and/or project partners are described per demonstration case, and their needs, abilities and contribution identified as far as possible. These first descriptions will serve as a base for continued work in WP4 and the iterative evaluation of the demonstration cases. Note that needs and abilities need to be further assessed as the implementation proceeds. The iterative process will provide a base for further improved implementation and development of methods and techniques through the process.

In total around 40 stakeholder organizations and/or project partners have been identified as relevant to the project. The gathered knowledge among the different stakeholders, their abilities and potential role and contribution will together with other work packages be used to create a framework and a method for how to implement the platform. It is still early in the process to identify stakeholders' effect on implementation and how their abilities will affect the process, but it is clear that many are of great importance for a successful implementation, mainly regarding access to data and/or monitoring, expertise, knowledge and to generate data for the platform.

The gathered knowledge, abilities, potential role and contribution will together with other deliverables be used to create a framework and a method for evaluation. This deliverable, together with more specific workshop details and technical specifications in D1.3, as well as the theoretical framework in D5.1 will be used as a foundation for further planning of how to implement and illustrate how the SCOREwater approach and platform achieves smart resilient water management.



PURPOSE AND INTRODUCTION TO BASELINE ASSESMENT

To serve the iterative evaluation through the project process and to contribute to a successful implementation of the SCORE water platform and approach we need to define a starting point of each case. The iterative evaluation will be carried out through a number of deliverables within the work package and aims towards a continuous learning process and thus contribute with knowledge on what works and what doesn't. In work package one (D1.3) the related analysis is done regarding specification and technical details. This assessment in work package four focuses on describing organizations and their conditions, abilities and contributions, as a project participant and/or stakeholder, as well as needs and requests from SCORE water. The assessment also aims to describe the different stakeholders' roles in the project.

This report is based on the stakeholder analyses conducted by each case city, and it presents the stakeholders identified as relevant and invited to workshops in each case city. Involved stakeholders and/or project partners are described per case study, and each stakeholders' needs, abilities and contribution are identified. This first descriptions will serve as a base for continued work in WP4 and the iterative evaluation. The iterative process will provide a base for further improved implementation and development of methods and techniques through the process. In D5.1 there is an overview of the theoretical framework for stakeholder engagement, implementation etc. presented. This assessment complements this and in combination, a framework for evaluation based on stakeholders needs and abilities of the SCORE water approach will be developed. Any implementation strategy needs to be adjusted to both the specific innovation and the organisational context, based on understanding the behaviour that needs to change. The purpose is to match the new practice and the organisational capacity and readiness for change (Fixsen, 2005).

In all three cities, workshops have been arranged as a trigger for the project and to enable cooperation with wide variety of stakeholders. For the common purposes of D1.3 and D4.1 the most effective way to gather information from, and about, stakeholders was assessed to be through workshops and not as first suggested, interviews. In task 4.1, common guidelines for workshops were therefore developed. Even though the three workshops have been organised case-specific, the aim with the common guideline was to help ensure cohesion between cases, where relevant, and to contribute to a common structure between the cases. This was done in order to reach the set objectives for the task and to be able to gather the kind of information planned for. But also, to help progress in each case and to ensure the demonstration cases are responding to stakeholder needs. Focus groups and smaller groups have been held in some of the workshops when relevant. As the cases progress, focus groups might be arranged as well as interviews if needed to reach deeper understanding of factors affecting the implementation of SCOREwater that cannot be collected from workshops with larger groups.

The workshops focused mainly on building network, getting the stakeholders involved and on informing about the aims, goals and practical aspects of the project. Also, to identify organizational conditions, specifications for the platform, stakeholders' possibilities to provide input as well as their needs. Detailed descriptions of the workshop can be found in D1.3.

Each stakeholder and/or project partner are described below per case study but a there are a few organizations involved and contributing to all three cases which we describe briefly here. These are:

- Civity BV is a company that specialises in data logistics services as well as data management services for smart cities, based on FIWARE-solutions. Civity helps to improve interaction between governments, citizens and businesses with data portals, tooling and applications. Civity is responsible for work package three which includes develop the SCOREWater platform. The goal is for the platform to make the development of new, integrated smart water solutions easy and allows for greater concentration of resources in value-added applications by facilitating the communication, flow of data, and the management of devices and by linking machines, devices, applications and people. The platform is the core of the project and all three cases.



- Future City Foundation is a public-private partnership enabling open innovation and stimulating open standards through FIWARE, offering a FIWARE Lab and community for Smart City innovation. They support organizations to find innovative solutions to societal issues by offering low-barrier access to industry expertise in the field of digital service innovation. Future City lead the communication and dissemination activities in SCOREwater and supports the three cases with different communication tools. A part of Future city's work in the project is to help create public engagement via science centres, serious games and apps. Universeum in Gothenburg, and other science centres in Barcelona, Amersfoort and other parts of Europe, will play a vital role to reach and engage the public.
- EURECAT is currently the leading Technology Centre in Catalonia, and the second largest private research organization in Southern Europe. They have wide experience in the integration, homogenization and standardization of heterogeneous water data sources (smart water systems, decision support tools, distributed databases, hydraulic systems) and external systems (meteorological information, FIWARE, SOFIA, OGC® tools). EURECAT is responsible for Work package 2 which will start at month seven and will exploit heterogeneous data provided by SCOREwater Data framework and apply novel data analytics and machine learning techniques to create smart water services. WP2 will design algorithms for all three cases, for example: early warning of fatberg development and early warning of pollution from construction sites.



1. BARCELONA CASE STUDY

The goal within SCOREwater is to innovate in the digitalization of water services, by demonstrating how sensing the sewer system of Barcelona can provide information at a neighborhood scale on health status, dietary habits and waste management at households. This information will be used to: 1) reduce the discharge of antibiotics in the environment, 2) promote healthier dietary habits, 3) prevent damaging discharges from households of wet wipes, oils and greases to the sewer system, and 4) decrease sewer maintenance costs.

The project outcome is a smart water management system embedded into the SCOREwater platform of Barcelona. In more detail we will obtain the following outcomes: i) a systematic manner for processing water quality and water quantity information to elucidate population habits; ii) extending existing water quality sensors to monitor oils and greases from domestic wastewater; iii) an innovative service to design health and environmental awareness campaigns; iv) a data driven model for sewer maintenance which uses citizen science.

1.1. DESCRIPTIONS OF RELEVANT STAKEHOLDERS, THEIR NEEDS AND ABILITIES

The stakeholders in the Barcelona-case include public bodies and associations dealing with the operation and maintenance of sewer systems, public health organizations in charge of defining public awareness campaigns on health issues, associations in charge of defining new strategies and policies for proper residues disposal, clusters of companies and research centers on health issues. The wide spectra of stakeholders provide different views and widen the goals and possible applications for the case study.

Within SCOREwater, Barcelona-case will interact with the platform in two ways: 1) become an active user of the SCOREwater platform or 2) become a data provider for the platform. Details on the identified potential stakeholders can be found below, with a short description and their role in regard to the SCOREwater demonstration case Barcelona.

Table 1 presents an overview of relevant stakeholders in the case, below are further descriptions.

Table 1. Summary of stakeholders to the Barcelona case.
Column S/P specifies S (Stakeholders); P (project partner)

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
Catalan Waste Agency (ARC)	Public body	S	Collection of information on the habits of residues handling in households	Co-design public awareness campaigns on recycling and proper residues deposition (wet wipes and oils and greases)
Direcció de Neteja i Residus Ajuntament de Barcelona	Public body	S	New models for the optimization of waste management	Co-design Public awareness campaigns on recycling and proper residues deposition (wet wipes and oils and greases)

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
Fundació Catalana per a la Prevenció de Residus i el Consum Responsable - Rezero	Public body	S	Collection of information on the habits of residues handling in households	Co-design Public awareness campaigns on recycling and proper residues deposition (wet wipes and oils and greases)
Water and Sewage Public Operators Spanish Association (AEAS)	Non-profit	S	New models for the optimization of waste management services	Disseminate project outcomes to Spanish sewage public operators
Agència Catalana de l'Aigua	Public body	S	New models for the optimization of water management services;	Co-design public awareness campaigns on recycling and proper residues deposition (wet wipes and oils and greases)
Aqua Publica Europea	International association	S	New models for the optimization of waste management services;	Disseminate project outcomes to Spanish sewage public operators
Barcelona Metropolitan Area	Public body	S	<p>Better understanding of the environmental impact of household waste wet wipes and oils on sewage systems.</p> <p>Increased knowledge on environmental behavior (wet wipes and oils and grease) of citizens in order to design public campaigns.</p>	Support for SCOREwater activities related to sustainability and environmental education

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
Consell Assessor de Desenvolupament Sostenible (CADS) de la Generalitat	Group of experts	S	Better understanding of the environmental impact of household waste wet wipes and oils on sewage systems. Increased knowledge on environmental behavior (wet wipes and oils and grease) of citizens in order to design public campaigns.	Support for SCOREwater activities related to sustainability and environmental education
Agenda Urbana de Catalunya	Association	S	Not yet identified;	Support for SCOREwater activities related to sustainability and environmental education
Associació de municipis i Entitats per l'Aigua Pública, AMAP	Public association	S	Collection of socio-economic indicators and lifestyle habits in small and medium cities;	Define approach for upscaling the concept to small municipalities
Public Health Agency of Barcelona	Public body	S	information on the consumption of antibiotics and on the sources of antibiotic resistance genes	Public awareness campaigns on health issues. Antibiotics consumption and antibiotic resistant genes
Agència de Salut Pública de Catalunya	Public body	S	information on the consumption of antibiotics and on the sources of antibiotic resistance genes	Public awareness campaigns on health issues. Antibiotics consumption and antibiotic resistant genes
Vall d'hebron, oncologia department (VHIO)	Research centre	S	easy access to updated socio-economic information; identification of health status and risk factors biomarkers	Exchange of information regarding socio-economic indicators from neighborhoods Common protocol for microbiome diversity estimation

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
IDIBGI	Research centre	S	easy access to updated socio-economic information; identification of health status and risk factors biomarkers	Exchange of information regarding socio-economic indicators from neighborhoods Provision of information from Padris
Associació Clúster Digital de Catalunya	Cluster	S	Be updated on innovations on the digitalization sector	Identification of new business opportunities
OpenDataBarcelona	Public body	S	OpenDataBarcelona is a data provider, more than a data receiver	Define the transferability of data between the OpenDataBarcelona platform and SCOREwater
Network H2O;	Network	S	identification of innovations in the development of sustainable and smart cities;	Disseminate SCOREwater developments to the cities belonging to the Network H2O network
Catalan Water Partnership (CWP)	Cluster	S	Be updated on innovations on the water sector;	Identification of new business opportunities within the cluster of companies and research institutes working on the water sector in Catalonia.
BCASA	Public company	P	New models for the optimization of waste management services	Demonstration of the SCOREwater concept
UBESOL	Private company	S	Information on the characteristics of wet wipes causing blockages in sewer systems;	Provision of protocol for wet wipe characterization; collection of information from the sewer system of Barcelona on which are the typologies of wet wipes causing blockages.

Catalan Waste Agency (ARC)

Public organization responsible for executing the program of action of the Government of Catalonia regarding management of waste;

Needs: Collecting information on the habits of residues handling in households. Also, they need information on the typology of wet wipes that are found in sewers which are causing blockages.

Preconditions/abilities: Experience in the design of public awareness campaigns.

Direcció de Neteja i Residus Ajuntament de Barcelona (DNRAB)

Works with improvement of city cleaning and waste collection, based on criteria of quality and sustainability of services; through the optimization of resources and facilitating citizens with necessary instruments for a respectful attitude towards the environment.

Needs: New models for the optimization of waste management.

Preconditions/abilities: Experience in the design of public awareness campaigns; door-to-door waste collection and waste reduction at source.

Fundació Catalana per a la Prevenció de Residus i el Consum Responsable (Rezero)

Seeks and analyzing information in regards of creating knowledge, and design innovative campaigns. They propose transformative plans and policies and propose regulations for an improvement in the prevention of waste.

Needs: Collection of information on the habits of residues handling in households.

Preconditions/abilities: Experience in the design of awareness campaigns.

Water and Sewage Public Operators Spanish Association (AEOPAS)

Non-profit professional association of public water operators for the promotion and development of scientific, technical, administrative and legal aspects of urban water supply and sanitation services.

Needs: New models for the optimization of water and sanitation services.

Preconditions/abilities: Network of experts with long-lasting experience in the management of sewer systems.

Agència Catalana de l'Aigua (ACA)

The public entity of the Government of Catalonia assigned to the Department of Town and Country Planning and Sustainability and founded in 2000 as the hydraulic authority in Catalonia. In charge of the governing policies concerning water and based on the principles of the Water Framework Directive.

Needs: New models for the optimization of water management services.

Preconditions/abilities: The Catalan Water Agency (ACA), attached to the Department of Territory and Sustainability of the Generalitat of Catalonia, arose from the merger of the Health Board and the Water Board.

Aqua Publica Europea (APE)

The European Association of Public Water Operators. Unites publicly owned water and sanitation services and other stakeholders working to promote public water management at both European and international level.

Needs: New models for the optimization of water and sanitation services.

Preconditions/abilities: Network of experts with long-lasting experience in the management of water cycle systems.

Barcelona Metropolitan Area (AMB)

The Barcelona Metropolitan Area (AMB) is the public administration of the metropolitan area of Barcelona, which encompasses 36 municipalities with more than 3.2 million inhabitants. The AMB has expertise in the water cycle and the municipal waste management in the metropolitan area of Barcelona (36 municipalities). Moreover, it continuously performs and promotes activities to raise environmental public awareness on water and waste issues, recognizing the need of innovative social and technical integration.

Needs: Better understanding of the environmental impact of household waste, wet wipes and oils on sewage systems. Increased knowledge on citizens environmental behavior, in order to design public campaigns.

Preconditions/abilities: Access to socio-economic indicators from Barcelona (at a reasonable spatial and temporal resolution).

Consell Assessor de Desenvolupament Sostenible (CADS) de la Generalitat

Contains a group of experts, which advises the Government of Catalonia in the integration of sustainability in its main policies and actions, in line with the SDG:S. They assess design and execution of actions to promote education for sustainability.

Needs: Increased knowledge on environmental behavior (regarding wet wipes, oils and grease) of citizens in order to design public campaigns.

Preconditions/abilities: Advise the Government in the field of sustainable development, especially in the integration of sustainability into policy instruments and sectoral planning, projects and legislative and regulatory projects and strategic initiatives promoted by the Government.

Agenda Urbana de Catalunya (AUC)

The Urban Assembly of Catalonia is constituted as a multidisciplinary and collegiate body made up of representatives from each of the departments of the Government of Catalonia. Representatives of the local area and representatives of the citizen and business association. The Urban Agenda of Catalonia will be the tool that allows to enhance opportunities and face the challenges posed by the growing urbanization.

Needs: Not yet identified;

Preconditions/abilities: AUC planning is a dynamic instrument that contributes to increasing the coherence of Public Policy: Approved the document will be available on open data, it will make annual reviews for mantenerlo updated until 2030.

Associació de municipis i Entitats per l'Aigua Pública (AMAP)

Association of municipalities with the goal to disseminate and promote integrated public water management, as well as to support the municipalities that want to go towards public water management.

Needs: Collection of socio-economic indicators and lifestyle habits in small and medium cities.

Preconditions/abilities: AMAP has access to numerous sewer systems from Catalonia, which could be useful in a future upscaling of the approach. AMAP highlights that the SCOREwater approach proposed for Barcelona is highly relevant for small and medium cities, which normally lack information about socio-economic indicators; hence, the sewage sociology is more relevant in these cities.

Public Health Agency of Barcelona (ASPB)

Directs and manages the public health centers and services of the city commissioned by the City Council of Barcelona and the Government of Catalonia. Their purpose is to watch over health issues of residents of Barcelona as well as visitors.

Needs: Health public agencies need information on the consumption of antibiotics. Such information can be collected from health databases but is rather subjective. The provision of concentrations of antibiotics in sewage and the presence of antibiotic resistance genes will provide them with a complementary source of information to design public awareness campaigns.

Preconditions/abilities: Experience and data on environmental and health aspects of Barcelona.

Agencia de Salut Pública de Catalunya (ASPCAT)

ASPCAT is responsible for the promotion and protection of health, the prevention and management of epidemiological and food alerts, as well as for occupational health.

Needs: Health public agencies need information on the consumption of antibiotics. Such information can be collected from health databases but is rather subjective. The provision of concentrations of antibiotics in sewage and the presence of antibiotic resistance genes will provide them with a complementary source of information to design public awareness campaigns;

Preconditions/abilities: ASPCAT has experience in sewage sociology already; in fact, they execute two sampling campaigns per year in Barcelona to measure the presence of illicit drugs and provide an estimation of consumption per capita. This information is complementary to the one they collect from surveys. The Agència de Salut Pública de Catalunya hence has trust on the overall approach; they also have access to the PADRIS database (on health issues from Catalonia) which can be complementary to the SIDIAP database we plan to use in SCOREwater.

Vall d'hebron institute of oncology (VHIO)

VHIO is a leading comprehensive cancer center of excellence where its scientists and physicians adopt a purely translational research model, working together as multidisciplinary teams to both accelerate and advance personalized and targeted therapies against cancer.

Needs: Easy access to updated socio-economic information; identification of health status and risk factors biomarkers. Health research centers need socio-economic information from the neighborhoods of Barcelona to conduct their epidemiological studies on cancer research. Such information will be integrated from different existing sources and made available from the SCOREwater platform.

Preconditions/abilities: VHIO runs epidemiological studies, in which potential cooperation is envisaged (still to be defined, but the willingness to cooperate is clear).

Institut d'Investigació Biomèdica de Girona (IDIBGI)

IDIBGI is a research institute which promotes, develop, manage and disseminate biomedical research in the province of Girona.

Needs: Easy access to updated socio-economic information; identification of health status and risk factors biomarkers; Health research centers need socio-economic information from the neighborhoods of Barcelona to conduct their epidemiological studies on cancer research. Such information will be integrated from different existing sources and made available from the SCOREwater platform.

Preconditions/abilities: IDIBGI runs epidemiological studies in which some potential cooperation is envisaged (still to be defined, but the willingness to cooperate is clear).

Associació Clúster Digital de Catalunya (ACDC)

The Digital Cluster is a meeting space formed by a group of companies, entities and research groups with a linkage: ICT. ACDC brings together start-ups, SME's, large companies and other entities to boost the competitiveness of the Catalan ICT sector, while promoting a new business culture based on collaboration and open innovation.

Needs: Be updated on innovations on the digitalization sector.

Preconditions/abilities: Has a network of companies and technological centers which might potentially be interested in bringing SCOREwater developments into market.

OpenDataBarcelona

Open Data or Public Sector Information Openness is a movement driven by public administrations with the main objective to maximize available public resources, exposing the information generated or guarded by public bodies, allowing access and use for the common good and for the benefit of anyone and any entity interested.

Needs: OpenDataBarcelona is a data provider, more than a data receiver.

Preconditions/abilities: They provide open access to numerous socio-economic indicators of Barcelona; within SCOREwater we will explore a manner to connect the SCOREwater platform with the OpenDataBarcelona platform; discussions will start from month 6.

Network H2O

The Network for Water in European Regions and Cities, NETWERC H2O, is an association of European municipal and regional governments whose objective is the promotion and development of sustainable practices related to the management of water.

Needs: Identification of innovations in the development of sustainable and smart cities.

Preconditions/abilities: A network of cities which might be interested in the SCOREwater approach; Network H2O is an excellent dissemination channel.

Catalan Water Partnership (CWP)

The Catalan Cluster of sustainable use of water located in North East of Spain. With headquarters in Barcelona. CWP was launched in 2008, as a nonprofit strategic association business, for companies and research centers that work in the sector of sustainable use of water. Their mission is to improve the competitiveness of its members.

Needs: Be updated on innovations on the water sector.

Preconditions/abilities: Has a network of companies and technological centers which might potentially be interested in bringing SCOREwater developments into the market.

Barcelona cycle de l'aigua (BCASA)

Municipal public company managing the water cycle services of Barcelona city.

Needs: BCASA is a project partner but a stakeholder of what is going to be released. BCASA need to receive at real-time information about sulfide emissions in sewers. In addition, BCASA need to integrate the information from citizens claims (e.g. on bad odors) with their in-house system for collecting incidences during maintenance works. Overall, the need is to develop an intelligence framework which optimizes maintenance needs, offering a better service to customers.

Preconditions/abilities: BCASA developed the SEWERNET platform (optimization of sewer inspection for the maintenance) and access to IRIS (citizen complaints) and has long-lasting experience in managing sewer systems.

UBESOL GROUP

The Ubesol Group is a company which develops and manufactures household cleaning products, hygiene and personal care products.

Needs: Information on the characteristics of wet wipes causing blockages in sewer systems.

Preconditions/abilities: They have a method in place to characterize wet wipes found in sewers, which will be shared with the SCOREwater partners.

Process to identify user needs in the Barcelona case

The process of identifying user needs will be ongoing through the testing and implementation within the case. Three workshops are foreseen to collect these needs and convert to tangible ideas for the project:

- 1) Workshop to EXPLORE: where participants know each other and their work and where they explore the desires, needs and values expressed by the different entities, as well as their own needs and interests.
- 2) Workshop for IDEATION: where participants imagine and co-create responses to desires, needs and values and the messages expressed by the citizens when imagining revisions / adaptations of the research in progress and the paths of innovation, from the varied experiences around the table.
- 3) Workshop to detail PROTOTYPES: where the participants generate a storyboard that shows how the resulting research and product / service suggestions resulting from the project are modified in relation to desires, needs and values and the messages expressed by the citizens and suggests concrete actions that must be taken by the Interested parties present to realize this vision.

The first stakeholders' workshop (EXPLORE) was organized in Barcelona in September 2019 (find a description in deliverable 1.3). The SCOREwater project was introduced to stakeholders and discussions were launched to identify stakeholders needs. For some stakeholders it is already clear, but for others the process will require two more iterations, or to find the right interlocutor in their organization.

The IDEATION and the PROTOTYPES workshops will be organized before month 12 of the project. Further collection of needs will come in these two workshops.



1.2. IDENTIFIED HINDERS FOR SUCCESSFUL IMPLEMENTATION AT THIS STAGE

One potential hinder relates to the provision of confidential information to the SCOREwater platform; the data provider might be reluctant to give access to SCOREwater to access confidential data. The data provider should receive assurance on the capabilities of the platform, to secure data. Another potential hinder relates to the deployment of the monitoring stations, which is challenging in sewers; still, enough time (about 10 months) has been allocated to the task to address any unexpected technical issues.

The most important barrier on the implementation and use of SCOREwater platform in the stakeholder's day-to-day life relates to the non-willingness to change workflows. This might happen in public governmental agencies (e.g. ASPB, ASPC, ARC) where changing working protocols is rather complex. The importance is to keep a long-lasting and continued updates on SCOREwater developments in Barcelona.

Most of the identified stakeholders are public. One of the most important stakeholders for the development of the project is BCASA, because they are data providers and final users at the same time. However, stakeholders of health and waste-management entities will potentially get an important benefit from the platform. This means that the SCOREwater platform from Barcelona case will be a tool to improve citizens life quality.



2. GÖTEBORG CASE STUDY

The case aims to examine construction sites environmental impact on a city's stormwater system and to design a system which will minimize the negative environmental impact on the city stormwater system and for the recipients downstream. This will be done by strategic positioning of water sensors that measure water flow and water quality, analyzing the collected data and by optimizing the on-site water purification system.

The case will use the SCOREwater platform and the data will be analyzed by AI and Big Data analysis. It will disseminate easily accessible information on water quality and quantity to stakeholders and the public. Furthermore, the case will monitor legislation/rules/recommendations and will provide support for long term investments.

2.1. DESCRIPTIONS OF RELEVANT STAKEHOLDERS, THEIR NEEDS AND ABILITIES

The stakeholders in the Göteborg-case include representatives from construction companies, consultants' companies and municipalities. The wide spectra of stakeholders provide different views and widen the goals and possible applications for the case study. SCOREwater will be able to customize the case to get as relevant data as possible for the stakeholder, which also is an important part in building a business case out of the case study.

Table 2 presents an overview of relevant stakeholders in the case, below are further descriptions.

Table 2. Summary of stakeholders to the Göteborg case.
Column S/P specifies S (Stakeholders); P (project partner)

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
City of Gothenburg Environmental Administration	Municipality administration	S/P	Interests in increased efficiency and accuracy in monitoring water quality. Need easily accessible data presented in formats which can be handled by the city.	Deep knowledge in regulations and recommendation related to water measurements.
Kretslopp och Vatten (KoV)	Municipality administration	S	Stormwater system optimization to secure fulfillment of current and future requirements. Interested in data presented within in project for optimizing future storm water systems/networks.	Responsible for the storm water system in Göteborg. Unique knowledge about the systems and recipients within the City of Göteborg.
Swedish Transport Administration	State administration	S	Better understanding of environmental impact of construction projects. Earlier and more accurate feedback for possible issues.	Responsible for a part of the on-site water quality monitoring which will be in part used in the case study

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
NCC	Construction company	S	Better understanding of environmental impact of construction work. Earlier and more accurate feedback for possible issues	Construction entrepreneur responsible for the section Central Station of the West Link. Onsite knowledge and experience
Skanska	Construction company	S	Better understanding of environmental impact of construction work. Earlier and more accurate feedback for possible issues	Experience in big and small construction project. Can identify differences which is useful in dissemination of the project
Göteborg Energy	Municipal energy company	S	Not yet identified	Experience with infrastructure projects and construction planning
Gryaab	municipal wastewater treatment company	S	Increased knowledge of water quality to reduce amount of “clean” water going into treatment	Knowledge of water treatment and possible providers of data to the project
Liljemark Consulting	Environmental consultants	S	Not yet identified	Environmental experts related to construction work
Svenskt Vatten	Industry organization	S	Not yet identified	Big contact network with authorities, NGO’s and municipalities
IVL	Research institute	P	Conduct and future develop in applied research on urban water issues.	Many years’ experience in applied research. Experience in applied science in the field of sustainability
Swedish Hydrological Solutions	Water treatment company	P	Knowledge regarding impact from cleaning methods in regard to stormwater system	Developer of water treatment methods which is used at the construction side Central Station, West Link
Talkpool	ICT company	P	Research and development of data communication and data security	Wireless communication experts, and will provide IoT communication and security expertise
Universeum	Science center	P	Expand competence within the field of water to create a holistic view of environmental issues	Science center which is a perfect platform for communication and reaching out to the public

City of Gothenburg Environmental Administration (CGEA)

City of Gothenburg Environmental Administration is a partner within the project and will play an important role in the case of Göteborg with an extensive knowledge of what gaps in knowledge could be filled by the case study. CGEA is responsible to ensure that companies and operations in Göteborg are following applicable laws and rules.

Needs: CGEA is an end user of the case study and are interested in increasing efficiency of monitoring storm water in the city.

Preconditions/abilities: CGEA performs monitoring visits to verify companies self-monitoring and is following up any rules and conditions defined in the construction permits.

Göteborg administration Kretslopp och Vatten (KoV)

The mission of KoV is to provide all Göteborg citizens with reliable and environmentally friendly water supply and waste management including recycling. KoV is responsible for the quality of the stormwater and owns stormwater network within the city. The Göteborg-case study will partly measure in this stormwater network.

Needs: KoV has an interest in the water quality in the Göteborg's stormwater system and this knowledge has potential to contribute to further stormwater system optimization to secure fulfillment of current and future requirements.

Preconditions/abilities: Responsible for the storm water system in Göteborg. Unique knowledge about the systems and recipients within the city

Swedish Transport Administration (STA)

STA is a state administrative authority responsible for planning of transporting systems (road traffic, rail traffic, shipping and aviation) in Sweden. STA is responsible for construction, the operation and maintenance of state-owned roads and railways. STA is also responsible for designing and planning the West Link which is the construction project where the case study will be performed.

Needs: STA are also interested in a deeper understanding of how construction sites affect the stormwaters and stormwater systems from a bigger perspective.

Preconditions/abilities: STA is responsible for a part of the on-site water quality monitoring which will be in part used in the case study and is needed to access the data collected at the construction site.

NCC

NCC is a major Swedish based multinational construction company with ca 10 000 employees in Sweden. NCC is the main entrepreneur which is carrying out the construction at the Central Station site for the West Link.

Needs: Their interest is in optimizing the on-site monitoring to ensure the maximum efficiency of the water treatment and precautionary measures to comply with the current legislation.

Preconditions/abilities: NCC is responsible for a part of the on-site water quality monitoring which will be in part used in the case study. NCC has an extensive experience in compliance with the applicable rules to protect water quality at the construction sites.

Skanska

Skanska is construction company in Europe and USA, and with over 10 000 employees in Sweden alone one of the biggest actors at the Swedish market.

Needs: Skanska is interested to elaborate on differences between extensive infrastructure project like the West Link and smaller construction projects which are less regulated or regulated in a different way.

Preconditions/abilities: Skanska have unique knowledge in construction work which will be used in the case study when it comes to understand the impact from specific activities on the construction sites.

Göteborg Energy (GE)

Göteborg energy company is owned by the municipality of Göteborg. GE sells and distribute electricity, district heating, cooling and natural gas in west of Sweden. GE is also involved in development and maintenance of the city infrastructure (various infrastructure networks), typically at short term and local construction projects.

Needs: Not yet identified

Preconditions/abilities: GE have unique knowledge in construction work which is essential in the case study.

Gryaab

Gryaab is a municipality own company responsible for wastewater treatment in the region of Göteborg and for the major wastewater treatment plant including sewer pipelines. Gryaab is involved in West Link project by treating a part of contaminated water from the construction sites, more specifically in cases when the water is high in nitrate.

Needs: Increased knowledge of water quality in the storm water system to decrease the amount of relatively unpolluted incoming water.

Preconditions/abilities: Gryaab have unique knowledge in water purification and has also an extensive water quality control program. Gryaab data might be used as a reference measurement for the data collected in the case study.

Liljemark Consulting (LC)

Consulting company with experience in environment and sustainability. Liljemark is working with private and public clients mainly within industry, construction- and real estate companies. LC have unique knowledge in construction work which will be useful in the case study.

Needs: Not yet identified

Preconditions/abilities: LC have unique knowledge in environmental aspects of construction work which will be useful in the case study.

Svenskt Vatten (SV)

SV is an umbrella industry organization representing Sweden's municipal water service companies. SV collects and processes information, starts up and conducts investigations, supports research and development work and prepares advice and instructions. SV produces publications and organize courses and seminars to disseminate their knowledge and results. An important part of the work of SV is opinion formation and influence work. Therefore, their communication targets politicians, authorities and other organizations so that they consider the role of water service companies when making decisions that affect the industry. SV is a potential end user of the case.

Needs: Not yet identified

Preconditions/abilities: Well established communication with politicians, authorities and other decision-making organizations.

IVL Swedish environmental research institute (IVL)

IVL is one of Sweden's leading organization for environmental research and in this context co-ordinator of the SCOREwater project. With about 350 employees IVL covers a wide range of environmental research and consulting and includes also extensive laboratories for chemical analysis of various media and various pollutants. Long term ambition is to provide cutting edge scientific knowledge to help authorities in decision making and to help commercial companies to act in sustainable way. That is also reflected in IVL's policy to spent equal share of time on research project and on consulting projects, where the results from research are applied.

Needs: Conduct and future develop in applied research on urban water issues.

Preconditions/abilities: Many years' experience in applied research. Experience in applied science in the field of sustainability. Prerequisites to coordinate large research projects with government and industry involved.

Swedish Hydro Solutions (SHS)

Swedish Hydro Solutions is an innovation company in environmental- and water engineering which offers knowledge, products and equipment for effective and environmentally sustainable treatment of polluted water generated at construction sites. The SHS relatively young company (founded in 2015(?)) which is rapidly expanding with goal to be one of the leading suppliers of environmental and water treatment solutions in Europe. SHS is a partner in the SCOREwater project and will provide hands-on experience from water treatment and measurements at the Central Station West link construction site, where six of their purification units are currently installed. The water purification involves also water quality monitoring which will be expanded within the SCORE water.

Needs: Deeper understanding in how their water treatment methods impact the stormwater quality in a bigger picture.

Preconditions/abilities: SHS is a partner in the SCOREwater project and will provide hands-on experience from water treatment and measurements at the construction site Central Station, West Link, where six of their purification units are currently installed. The water purification involves also water quality monitoring which will be expanded within the SCORE water.

Talkpool (TP)

Talkpool is an information and communication technology company providing telecommunication & communication security solutions and services. TP has been working with Internet-of-Things (IoT) since 2014 with an inhouse developed of sensors and communication modems as well as cloud software and analytics. Talkpool's main expertise is in radio communication and communication security. TP is a partner in the project and will provide IoT communication and expertise to the project. TP will be responsible for the communication modems and network for the Göteborg case and for data integrity and privacy.

Needs: Research and development of data communication and data security.

Preconditions/abilities: TP is a partner in the project and will provide IoT communication and expertise to the project. TP will be responsible for the communication modems and network for the Göteborg case and for data integrity and privacy.

Universeum (UNI)

Universeum is a public arena for lifelong learning where children and adults explore the world through science and technology. Universeum exhibition and science centre in Göteborg has more than half a million visitors annually. Universeum creates experiences that enhance creativity and innovation, disseminate knowledge and stimulate critical thinking. With science as a basis and an education that engages, people are challenged to enrich their lives and act for a sustainable world. UNI is a partner in the project and will focus on communication regarding the Göteborg case. UNI has extensive experience in communication of environmental issues, and it has a unique communication channel through the science centre which is one of the main attractions in the city of Göteborg both for city inhabitants and for other visitors.

Needs: Expand competence within the field of water to create a holistic view of environmental issues.

Preconditions/abilities: UNI has extensive experience in communication of environmental issues, and it has a unique communication channel through the science centre which is one of the main attractions in the city of Göteborg both for city inhabitants and for other visitors.

2.2. IDENTIFIED HINDERS FOR SUCCESSFUL IMPLEMENTATION AT THIS STAGE

Available data have been one issue up for discussion. The case would benefit from accessing already gathered data from construction sites, which today are owned by several companies (which are represented as stakeholders: KoV, STA, NCC, Gryaab). One solution can be to develop supporting document to be able to use already gathered data.

Further, some of the measurement positions may not be owned by project partners or stakeholders related to them. To use them, will in that case, need an agreement with the companies owning the part of the grid which are of interest. Regarding data created within the case study we do not see any barriers at the moment to make it public and easily accessible.

The stakeholders are a mix of public and private companies with different interests and expectations of the case study. This will provide feedback from much needed different points of view.

It is difficult to define individual stakeholders' contribution to the case study at this point. The stakeholders related to the construction site at the West Link (STA & NCC) will be of great importance to provide access to monitoring data from the construction site. CGEA and KoV have a deep knowledge of the cities stormwater system and are potential end users of the data. Therefore, they are key stakeholders for the case study.

It is of great importance that these stakeholders are involved and interested in the case study because they help to ensure relevance and sufficiency of the generated data and knowledge. Stakeholder involvement will also help the implementation of sensors and other practicalities and will facilitate an easy access to the data from the construction site.

3. AMERSFOORT CASE STUDY

The overall goal of SCOREwater in Amersfoort is to make the city more climate and flooding resilient. Within the project, different focus areas are defined:

- Deploying an integral sensor network, which we use to collect data to gain more insight into how different types of water (groundwater, surface water and precipitation) can be managed and used more effectively;
- Combining the newly gathered data with existing data to get a better grip on water management. By using digital models, we can get a more holistic view of areas, for example when designing public spaces or in conversation with external stakeholders;
- Finally, together with residents, we will develop sensors to make water-related citizen science possible (for example, groundwater measurements or rainwater measurements). In this way we also involve the city in our activities, and we make use of their knowledge, skills and enthusiasm.

In Amersfoort, the focus is on two different geographical areas in the city: Amersfoort Central Station (1) and the Schothorst district (2). These are the first two tracks within the project. The third track is the involvement of residents in water measurements (Citizen Science) (3).

Amersfoort Central Railway Station (1)

The first area that the project focuses on is the Amersfoort Railway Station. This area is, among other things, a mobility hub and a place where people work and recreate. The area is going to change in the upcoming years: firstly, a large underground bicycle shed will be realized to make more room for bicycles. Moreover, the area has several climate-related problems, for which solutions must be found:

- Forecasts show risks of flooding;
- It has proved difficult to store water effectively and use it for climate-proof planning;
- The area is susceptible to heat stress;
- A lack of real-time information leads to uncertainty about how effective different types of measures are.

We distinguish two sub-tracks within the station area: the sensor network and (the use of) digital models.

Sensor network

With an integrated and implemented sensor network, we want to gain more insight into how the different types of water (groundwater and precipitation) can be effectively stored, managed and used in this area. Moreover, with sensors we want to get a good view of temperature and experienced urban heat island effect. This information will be used to assess the need for changes in this public area (*before redevelopment*) and to assess the effectiveness of changes in the area (*after redevelopment*).

Digital models

In addition to installing sensors, we are going to develop two digital models of the area for which the data collected by the sensor network will provide input. The first is a hydrological model, which will include data on precipitation and water storage capacity. This will be used to assess the risk of flooding in the area. Secondly, we will use a digital model to visualize proposed changes in the area. The model will include calculations on climate related indicators (such as heat stress and water storage capacity) and will be used to include external stakeholders in the redevelopment of the area.

Schothorst DISTRICT (2)

Schothorst is a pilot area for testing climate adaptive measures. Currently, the area has problems with drainage causing a risk of flooding. Flooding is mostly an issue at times of heavy rainfall, which is expected to get worse in the future. Furthermore, extended periods of draught cause issues in the area. More effective use of infiltration methods and methods to retain water are necessary to make the area more climate resilient. One of these measures is changing parking areas and squares to include more plants and trees.

Within SCOREwater we want to gain more insight into the effect / effectiveness of:

- the current drainage system;
- different types of layout of parking places for water infiltration and temperature;

Citizen Science (3)

The Amersfoort-based citizen science initiative ‘Measure Your City’ was launched in 2015 to involve residents of Amersfoort in the effects of climate change. Citizens run their own research projects, ask their own questions and decide on how to gather and manage their data. More than 100 citizens are now measuring temperature and humidity. Recently sensors for air quality have been added to this initiative. Within SCOREwater ‘Measure Your City’ will be extended with water measurements. In collaboration with citizens collective ‘De WAR’ and the local water authority we will include citizens in developing research questions, determining which data we wish to collect, which sensors can be used to gather this data and transforming this data into meaningful insights. The area of focus (e.g. ground water levels, precipitation, soil moisture etc.) is currently explored. The collected data will be visualized through the SCOREwater platform, boosting public awareness of the value of water and the workings of the natural water cycle.

3.1. DESCRIPTIONS OF RELEVANT STAKEHOLDERS, THEIR NEEDS AND ABILITIES

The stakeholders in Amersfoort include a variety of organizations, including public bodies, a residents’ collective, research institutions and a company working on water solutions. Their common interest is a focus on climate adaptation, e.g.: how can cities be built in such a way that they effectively deal with water and heat related problems? Within this focus each organization has its own role: for example, for research institutions want to gain scientifically accurate insight, while a resident’s collective intends to involve residents in how they can take measures of their own. As such, the variety of stakeholder involved provide an interesting basis for collaboration.

Table 3 presents an overview of relevant stakeholders in the case, below are further descriptions.

Table 3. Summary of stakeholders to the Amersfoort case.
Column S/P specifies S (Stakeholders); P (project partner)

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
Municipality of Amersfoort	Public body	P	Collect data on effectiveness of measurements, collect data of climate resilience indicators to assess need for change, include citizens to boost public awareness of climate related issues.	Project lead. Will contribute by leading the case study. Intends to increase efficiency and effectiveness of water management.

Organization	Type of organization	S/P	User needs	Role (contribution + outcome)
Waterschap Vallei en Veluwe	Public body	S	Boost public awareness of water management issues, gain more data and insight on water related issues in the Amersfoort region.	Stakeholder. Will contribute by adding knowledge and collaborating. Intends to increase efficiency and effectiveness of water management activities.
Hydrologic	Consultancy, IT and water management	P	Test existing and develop new services , translate use cases to user needs and system requirements.	Project partner. Will contribute by advising on plans and analyzing data on water management.
Civity	IT, builder of data platform	P	Needs: connections to available data and insight in standards, models and API's to collect, transform and provision the data.	Project partner. Will contribute by building data platform.
De WAR	Citizens collective	S	Involve citizens in citizen science, creating awareness among citizens, whilst at the same time gathering more and more varied data on the environment.	Together with the municipality and the water authority De WAR will involve citizens in the development and deployment of water sensors.
Academia (University of Applied Sciences of Amsterdam, University of Utrecht, University of Twente)	Research Institutes	S	Gain more knowledge in effectiveness of climate adaptive measures, spread knowledge of previous research, gaining knowledge in effect of including citizens in climate adaptive measurements.	<i>To be defined</i>

Municipality of Amersfoort (or: City of Amersfoort, COA)

The municipality of Amersfoort is a partner in this project and is responsible for the case study. It owns several sensors in the area and will use the data collected to improve the effectiveness of its water management activities. As the owner of the public area, the municipality is responsible for the design and maintenance of the public area. By gathering additional data and insight into climate related issues it intends to do this more effectively.

Needs: collect data on effectiveness of measurements, collect data of climate resilience indicators to assess need for change, include citizens to boost public awareness of climate related issues.

Preconditions/abilities: experience with citizens science and how to cooperate with different stakeholders. Furthermore, COA employs citizens of different disciplines (e.g. climate adaptation, data science) that can contribute to the project.

Water Authority Vallei en Veluwe (Waterschap Vallei en Veluwe)

The local water authority (Waterschap Vallei en Veluwe) is involved as a cooperation partner and is responsible for water management. The municipality works closely with the local water authority on many water-related issues. As such, the municipality believes it is important to include the water authority within the project. Within the project, the water authority is mainly connected to the citizen science subtrack, and has shown interest in the use of both digital models.

Needs: boost public awareness of water management issues, gain more data and insight on water related issues in the Amersfoort region.

Preconditions / abilities: experience with citizens science, hydrological knowledge.

Hydrologic (HR)

HydroLogic Research (HR) is a hydroinformatics SME specialised in providing innovative water-management solutions and services in the Dutch and international markets. HR is ISO-9001 and ISO-14001 certified by Lloyd's for quality of the research and development processes and for sustainable environmental management. HR's activities focus on the major processes and components related to the water environment, such as urban and rural water management, water safety, fluvial and pluvial flood simulation, weather information, forecasting and warnings. The applications and services developed use advances in hydroinformatics such as simulation models, data-driven modelling, remote sensing, GIS-based modelling, web services and mobile information and communication technologies. The developed hydroinformatics tools and applications are made accessible via the open HydroNET SaaS platform (www.hydronet.com). HR is based in Amersfoort.

Needs: To HR, the Amersfoort case is an opportunity to test existing and develop new services based on user needs emerging from the project. The process of translating use cases (on the Railway and Schothorst sites) to user needs and system requirements is a valuable test bed for service and business development.

Preconditions/abilities: The observations to be produced by SCOREwater provide the opportunity to validate and improve the service(s) in a research environment. For this, as part of the project, a two-way automated connection must be established between the HydroNET and the SCOREwater platform, thus integrating HydroNET into the SCOREwater platform.

Civity

Civity is the SCOREwater platform provider for the project within the city of Amersfoort. The SCOREwater platform connects the suppliers of data with the consumers of data. In that sense Civity should connect to the data from Amersfoort, Hydrologic, De WAR and other stakeholders and make the data, models and solutions available in the Data Market, which is an important part of the SCOREwater platform development. Civity participated in the workshops and discussions with Amersfoort.

Needs: connections to available data and insight in standards, models and API's to collect, transform and provision the data.

Preconditions/abilities: The SCOREwater platform uses the FIWARE-architecture and applies FIWARE data models. Together with data suppliers the standards, security/access and quality needs to be managed.

De WAR

De WAR is a citizen's collective in Amersfoort where citizens can start various initiatives. There are different types of initiatives within De WAR: for example, a researcher researches the breeding of duckweed, a food collective is housed at De WAR and several organizations work together with De WAR on citizen science initiative "Measure Your City". The latter is relevant for SCOREwater: "Measure Your City" is a collaboration between De WAR, the municipality and the local water authority to build sensors and collect data together with residents. Currently, these include humidity and temperature measurements, while air quality measurements are being developed. Within SCOREwater, we will expand "Measure Your City" with water measurements.

Needs: De WAR has several motivations to collaborate:

1. Increase the involvement of residents in their own living environment, thus increasing awareness of issues and possibilities related to this.
2. SCOREwater provides possibility to increase the amount and the scope of citizens involved, thus generating more data, insight and involved people;
3. As a result, "Measure Your City" will provide a more holistic view of climate resilience within the city.

Preconditions/abilities: knowledge on how to successfully use citizens science, knowledge on data science. An important precondition for De WAR is that all data collected is published as open data.

Academic institutes

Three academic institutes have shown interest in SCOREwater and have been approached to discuss their potential involvement in the project. The University of Applied Sciences of Amsterdam has knowledge on the urban heat island effect. They intend to contribute by both providing this knowledge and by gathering additional data in the Amersfoort station area. The Universities of Twente and Utrecht intend to contribute by focusing on the effect of including citizens in climate-adaptive measures and measurements. If and how they will be included in the project is subject of meetings planned for late 2019.

Needs: gain more data and insight on climate resilience indicators and the effect of including citizens in climate related citizen science

Preconditions / abilities: knowledge on how to do scientific research.

3.2. IDENTIFIED HINDERS FOR SUCCESSFUL IMPLEMENTATION AT THIS STAGE

There are a number of potential hinders for successful implementation that require careful consideration:

Firstly, some of the data that we wish to include in the analysis is closed data. We need to examine whether this data can be published on the SCOREwater platform. Secondly, we have noticed that many of the words we use in the project lead to different expectations. We need to establish clear definitions of terms used; such as a digital model/digital twin, groundwater model, hydrological model, flood alarm, test bed and sensor network.

Citizen science is difficult to plan as it thrives on the availability and energy of volunteers. This is a challenge, as we need to ensure that activities are aligned properly. The WAR is a key stakeholder in this. Their contribution and involvement can affect the implementation. De WAR must agree with the proposed citizen science activities as they are the driving force behind the “Measure Your City” community and we want to make use of this (well established) community and their knowledge, skills and enthusiasm in this SCOREwater project. Therefore, the WAR will be involved in all citizen science activities.

One key issue is that changes that will happen in the station area are to be determined by politicians. This may affect SCOREwater in Amersfoort, as the planning will affect our measurements. The project team are monitoring this.

The stakeholders identified are both public and private. As such, it is important to make sure that their needs and requirements are clear and do not conflict. If they do, the required cooperation between public and private stakeholders may be in danger. This means that open dialogue and business transparency are essential in order to accomplish a certain level of trust needed for successful cooperation. Again, the most relevant stakeholders are the project partners and citizens collective De WAR: their contribution and involvement are key to successful implementation. The other stakeholders are expected to be meaningful contributors but are less essential to successful implementation.

It is important to make sure that processes are flexible, and stakeholders are regularly consulted. The process will be iterative to ensure that the interests and goals of internal and external stakeholders will be met. The iterative process will be ongoing during the project, therefore, a certain degree of flexibility in the project plan is necessary to ensure ongoing commitment, participation and enthusiasm of stakeholders.

4. CONCLUSIONS AND USE OF BASELINE

This report provides a first overview of the relevant stakeholders as well as project partners in each of the cases and thus in the project. It aims to provide input on the stakeholder's abilities as well as to what factors that need to be taken into consideration when the project progress. The purpose of the report is to provide a first assessment for the iterative evaluation which in turn should enable improvement in the implementation. This report is aiming to assist other work packages. In the process of implementation, it is useful to involve practice experience through for example facilitating discussions and focus groups among administrators, practitioners, end-users, and experts with knowledge about the new practice and implementation (Osterse, 2017).

As we are still early in the project process, much details are yet to be decided upon and information to be gathered. The roles and/or contribution of all stakeholders are not all specified, and their involvement has not been fully identified. The demonstration cases are at present time being developed and planned in more detail. The definition of stakeholders needs, as well as contributions is an ongoing iterative process.

In Barcelona, the stakeholders and project partners include a wide spectra; public bodies, public health organizations, associations dealing with the operation and maintenance of sewer systems, associations in charge of defining new strategies and policies for proper residues disposal, clusters of companies and research centers on health issues. In total there are 20 organizations that are regarded relevant stakeholders for continued work. An issue that needs to be further looked into in the Barcelona case, as well as in general for the project, is how the SCOREwater platform can be integrated to different stakeholders' structures, workflows etc.

In Göteborg, the stakeholders and project partners include representatives from construction companies, consultants' companies and municipalities organizations. A total of 13 organizations, including partners already in the project, are considered relevant stakeholders. Some hinders that already been up for discussion is what resources the project has to access available data as well as to be able to gather data at sites not available today.

In Amersfoort, the stakeholders are public bodies, research institutions, a residents' collective, a company working on water solutions and a company providing the data platform. Their common interest is a focus on climate adaptation which is also the focus for the demonstration case. In total six relevant organizations have been identified. A barrier regarding citizen science is identified, the case demands engagement from the civil society. It needs to be considered and further investigated how these activities will succeed and contribute to the project.

It is still early in the process to identify stakeholders' effect on implementation and how their abilities will affect the process, but it is clear that many are of great importance for a successful implementation, mainly regarding access to data and/or monitoring, expertise, knowledge and to generate data for the platform. Further, it is important to continue the process to define roles, contributions and abilities among stakeholders, as well as to identify what data that is needed and available, or could be made available.

The gathered knowledge among the different stakeholders, their abilities and potential role and contribution will together with other deliverables be used to create a framework and a method for evaluation. This deliverable, together with more specific workshop details and technical specifications in D1.3, as well as the theoretical framework in D5.1 will be used as a foundation for further planning of how to implement and illustrate how the SCOREwater approach and platform achieves smart resilient water management. Potential stakeholders will also be further analyzed in order to identify their role and how the project, in best way possible, can meet their needs as well as use their input to reach our goals.



5. REFERENCES

- [1] Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M. and F. Wallace. (2005). Implementation Research: A Synthesis of the Literature. The National Implementation Research Network, Publication 231.
- [2] Osterse, J. & D. Graff (2017). New Approaches to Policy Implementation. Ramboll.





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BARCELONA



GÖTEBORG

