WATERLINE STAKEHOLDERS NEEDS ANALYSIS

(Project ID CHIST-ERA-19-CES-006)

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About this document

Deliverable: D4.1 Stakeholders Needs Analysis

Work package in charge: WP4 Co-development with stakeholders

Actual delivery date for this deliverable: Project-month 12/24

Dissemination level: The general public

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7. SUMMARY OF THIS PUBLICATION

The present document is a summary of the CHISTERA Waterline stakeholders' needs analysis as identified by the various partners activities in their study areas. Stakeholder needs analysis is an important process that involves identifying and analyzing the requirements, expectations, and concerns of various stakeholders who are affected by a project or an organization's operations (Khan, S., & Hoque, N., 2016). The aim of this analysis is to ensure that the project or organization's objectives align with the stakeholders' needs and expectations. In this report, we will discuss the process of stakeholder needs analysis, its importance, and the tools and techniques used to conduct it.

2 WHY STAKEHOLDERS' INVOLVEMENT IS IMPORTANT

From the project start all consortium partners have agreed on the exploration and complying with the stakeholders needs as identified in each Waterline study area.

Process of Stakeholder Needs Analysis: The process of stakeholder needs analysis typically involves the following steps (Bryson, J. M., 2018; Khan, S., & Hoque, N., 2016; Creswell, J. W., 2014):

1. Identification of stakeholders: This involves identifying all the individuals, groups, or organizations that are impacted by the project or the organization's operations.
2. Gathering stakeholder information: This involves collecting data on the stakeholders' needs, interests, and expectations. This can be done through various methods such as surveys, interviews, focus groups, or online feedback forms.
3. Analyzing stakeholder information: This involves analyzing the information collected from the stakeholders to identify common themes, issues, and concerns.
4. Prioritizing stakeholder needs: This involves prioritizing the stakeholders' needs based on their importance, urgency, and impact on the project or organization.

5. Developing strategies to address stakeholder needs: This involves developing strategies and action plans to address the stakeholders' needs and concerns.

Importance of Stakeholder Needs Analysis: Stakeholder needs analysis is important for several reasons:

8. It helps to ensure that the project or organization's objectives align with the stakeholders' needs and expectations.
9. It helps to identify potential conflicts and issues that may arise between different stakeholder groups.
10. It helps to improve communication and collaboration between the project or organization and its stakeholders.
11. It helps to identify opportunities for stakeholders to contribute to the project or organization's success.

Tools and Techniques for Conducting Stakeholder Needs Analysis: There are several tools and techniques that can be used to conduct stakeholder needs analysis, including (Bryson, J. M., 2018; Khan, S., & Hoque, N., 2016; Creswell, J. W., 2014):

1. Surveys: Surveys are an effective way to gather information from a large number of stakeholders. They can be administered online, via email, or in person.
2. Interviews: Interviews are a more in-depth way to gather information from stakeholders. They can be conducted one-on-one or in a group setting.
3. Focus groups: Focus groups bring together a small group of stakeholders to discuss specific issues or topics related to the project or organization.
4. Online feedback forms: Online feedback forms allow stakeholders to provide feedback and suggestions in a convenient and accessible way.
5. Data analysis tools: Data analysis tools such as Excel or SPSS can be used to analyze the data collected from the stakeholders.

It is thus concluded that stakeholder needs analysis is a critical process that helps organizations to identify and address the needs and concerns of their stakeholders. By

conducting a thorough stakeholder needs analysis, organizations can improve their communication and collaboration with stakeholders, identify potential conflicts, and develop strategies to ensure that the project or organization's objectives align with stakeholders' needs and expectations.

3 STAKEHOLDERS IN WATERLINE PROJECT

In Waterline project stakeholders play a paramount role. Thus, WP4 is devoted to stakeholders' involvement aiming to develop solutions that are useful for key project stakeholders' groups. Therefore, we engage stakeholders based on their interest and willingness to participate to the project, ranging from farmers, companies developing of monitoring solutions to decision makers in land and water management. From past projects we have a good network of stakeholders which will be updated before the project starts.

Specific objectives are to:

- From the project start, interact with stakeholders (stakeholder mapping and communication). Determine their needs in terms of getting information related to hydrological nowcasts and forecasts and in terms of accessibility to information (visualisation etc.)
- Form data-to-services value chain teams to co-develop (experts and stakeholders) modules of WATERLINE web services tools
- Actively engage end users in collecting and analysing hydrological data utilizing exiting co-creation brainstorming toolkits as that developed in the EU project RICHES (https://www.riches-project.eu/
- Assist in end-user friendly product development, uptake and dissemination, continuous engagement and feedback
- Ensuring end-user engagement after the project's implementation
- Increase stakeholders' and citizens awareness of hydrology and water resources management/use/availability
- Integrate project results into a final legacy package (summary of project outputs in a user-friendly way).

During the Waterline project we actively interact with stakeholders to define their specific needs and preferences, which will serve as an input for WP1, WP2 and WP5. WP4 will integrate the results and interact with stakeholders to co-develop web services tool for crowdsourcing and visualizing of environmental information. As the web services tool of WP5 is distinguished in three modules, i.e. one for scientific use, one for visualization and one for crowdsourcing, stakeholders express their needs and preferences on each module. Each stakeholder group formulate needs and preferences for the associated modules in terms of user friendliness, functionalities, accessibility, etc. As scientific community is also considered a stakeholder of WATERLINE scopes, due to the high novelty and new technologies used, we also investigate preferences of researchers related to the 1st module of WATERLINE's web services tool.

4 WORK DONE IN EACH STUDY AREA

In Waterline project stakeholders are involved in three study areas defined as Waterline case studies. Within each case study stakeholders'' groups are identified and specific activities are targeted towards each such group. Below there is a brief description of the stakeholder involvement activities in each study area.

4.1 THE VOSVOZIS RIVER BASIN – NE GREECE

The Vosvozis River Basin in NE Greece is the focus of research for the participating organization Democritus University of Thrace (DUTH).

Vosvozis River Basin is located in a rural area in NE, covering an area of ~400 km^2. Agricultural land uses take place in the plain and mountain parts. Tourist activities are found in the coastal zone to the south. From the hydrological point of view the Vosvozis River Basin forms a typical mountain front system recharge area. Problems to be addressed are related to water resources allocation, fire prevention, support tourist sector and other mild industrial activities, minimize impacts from water related disasters like flood and drought. From the very beginning of the project and despite the COVID restrictions the DUTH group identified various stakeholders' groups and actively

involved them in project activities. The following groups were identified in this specific case study area:

1. Civil services: Municipal Water Company namely DEYAK, Fire brigade, Civil protection Agency
2. Regional and local authorities
3. Local working groups: Farmers, industry processing agricultural products (cotton and corn), entrepreneurs in the tourism, public authorities (water agencies, fire brigade, hydrological monitoring), decision makers, forest managers
4. Local clubs – groups
5. Schools
6. Scientists actively working within the study area
7. The wider community

From the beginning of the project the DUTH team initiated the communication campaign and organized information meetings with all stakeholders in order to engage them in the project activities:

1. Creation of release of promo video in order to inform all interested stakeholders. The video is available here:

   https://drive.google.com/file/d/1sgYPrIeoItc58t721XrOW-jcrYG1ydk8/view?usp=sharing , and in the Waterline web page.

2. Meeting and cooperation with the Prefecture of Rhodope region during September 2021. The DUTH team presented the aims of Waterline project and how it can contribute to the improvement of civil services, civil protection.
3. Initiation on May 2021 of a very successful cooperation with the group of amateur meteorologists namely Weather News of Thrace (Kairika Nea Thrakis). This group has 40.000 members in the broader study area and it is very active in the social media. It is a very effective channel of communication our work to various stakeholders.

4. DUTH team has released many articles in local press. Below you may find links to the published articles:

   https://www.paratiritis-news.gr/koinonia/anoichta-dedomena-apo-to-diktyo-meteorologikon-stathmon-stin-oreini-rodopi/

   https://www.paratiritis-news.gr/aparatirita/20-meteorologikoi-stathmoi-gia-tin-egkairi-proeidopoiisi-sti-rodopi/,
   https://www.paratiritis-news.gr/koinonia/i-diatirisi-ton-ydatinon-poron-sti-rodopi-chreiazetai-tin-syndromi-olon/

5. On 28th of September 2022 an open meeting with the general public and every interested stakeholder has been organized. The DUTH team presented the objectives and findings of the Waterline project and highlighted many ways of stakeholder involvement in the project. People got familiar with environmental monitoring and learned how they can contribute to environmental monitoring with low-cost equipment. This event was been cover story for the regional newspaper Paratiritis tis Thrakis.
6. On 6th and 7th October 2022, a hybrid training event titled: “Multi source data processing and assimilation in hydrological models and forecasting” for early career scientists. The educational material can be accessed here: https://drive.google.com/drive/folders/1xUrlpCfY25FLA2c-b5B8oA6UE6Kr4NGA?usp=sharing
7. Waterline project was also presented to the academics Επίσης το έργο παρουσιάστηκε στην έκθεση Academia exhibition organized by the International Thessaloniki Trade Fairτης ΔΕΘ during September 2022. Thus, academic community has been informed of the scientific products and services of the Waterline project.
8. A seminar targeting the farmers’ community was organized on 28th and 29th January 2023, by a local agronomists’ union and the DUTH team was invited to present the open data platform and how local farmers can take advantage of it. A free and open web tool to monitor vegetation productivity, moisture conditions and evapotranspiration was presented to the audience. A

demonstration highlighted the user friendly character of the tool and its usefulness. The tool can be accessed here: https://alexandragemitzi.users.earthengine.app/view/agrapp

The DUTH team exchanged ideas with the farmers present and got feedback from them related to how they would perceive such an application and what changes would be useful to them. In that way the DUTH team made changes accordingly and the updated tool is now freely available and has been released: https://alexandragemitzi.users.earthengine.app/view/myfarm

9. The Waterline team has also created a Science Citizen application where everyone can report a weather or environmental related event.
10. DUTH team has a close cooperation with the student community and high schools in the study area. Therefore, a memorandum of cooperation with the 2nd Vocational School of Komotini has been achieved and in the near future environmental sensors are going to be installed in the school yard, initiating a live environmental laboratory for school community to use.

Lessons learnt from stakeholders' involvement were that most stakeholders' coming from the wide community were very interested in learning about environmental monitoring and very willing to contribute to it. There were many requests concerning data from the Waterline monitoring network in the study area, but also requests concerning merging our network with other monitoring facilities. Farmers also were very enthusiastic with the use of the vegetation monitoring tool that was released.

On the other hand, besides the very positive messages from meetings organized with the local authorities, there seems to be a reserved attitude towards novel technologies and instruments that can greatly facilitate environmental monitoring and policy making. In the near future, we plan to focus and work closely with the local authorities, so as to improve their willingness to contribute and co-develop with the scientific community in their areas

4.2 THE KOCINKA RIVER CATCHMENT - S POLAND

The Kocinka catchment (surface area of 257.8 km^2) is located in the south of Poland in the Oder river catchment in the Baltic Sea basin. The 40.2 km long Kocinka river discharges to the Liswarta river. The dominant land use is agriculture (over 60 %). The catchment is covered by 1 - 33 m thick Quaternary deposits of fluvio-glacial and aeolian origin underlain by the Jurasic strata. The Upper Jurassic limestones strata, which underlie most of the catchment, contain one of the largest groundwater bodies in Poland – the Major Groundwater Basin 326E. The Kocinka and its tributaries are strongly groundwater-dependent with around 90 % of streamflow being derived from groundwater. A peculiar feature of the catchment is that groundwater controls not only the quantity but also the quality of river water, because of high levels of nitrate in groundwater, exceeding in some parts of the aquifer, the 50 mg/L limit.

A previous study (SOILS2SEA www.soils2sea.eu) conducted in the same area aimed at identification of local and regional stakeholders. Given the close intertwining of the surface and subsurface hydrology and agricultural nitrate pollution being the main water resources management problem a wide range of potential stakeholders was considered, including local farmers, authorities, NGOs, industry, as well environmental agencies. Lessons learnt from that project were that local authorities and NGOs show little willingness to become actively involved in research or monitoring initiatives dedicated to the understanding and improvement of water resources.

For historical reasons (i.e. predominance of small-scale and part-time farming and general mistrust of cooperative approaches), farmers in the case study area demonstrated a lack of support for bottom-up processes. Moreover, farmers do not perceive their agricultural activities as directly related to the water resources management issues. Interviews with farmers revealed, however, that spring droughts are a major issue because they affect crop yield by delaying germination of plants. One can thus assume that farmers might be interested in obtaining frequently updated information on soil moisture content and particularly in predictions of soil moisture development. Due to the aforementioned fragmentation of agricultural land such products should have an adequate spatial resolution.

Surprisingly, a stakeholder highly interested in collaboration appeared to be recreational anglers of the Polish Anglers Association (PAA), Częstochowa Branch. During several meetings with the representatives of this stakeholder they shared their thorough knowledge of the hydrological issues that affect the ecological status of the catchment.

Their interest lies strictly in the improvement and preservation of the quantitative and qualitative status of rivers and streams of the catchment that are an important trout hatchery. The capacity of the Kocinka and its tributary to maintain a sustainable population of fish is adversely affected by the obstacles to flow, such as in-stream vegetation and beaver dams, that reduce water discharge and velocity. In this regard, the PAA collaborates closely with the representatives of governmental agencies, such as the Regional Directorate for Environmental Protection and National Water Management Authority “Wody Polskie”. These personal contacts are crucial for the involvement of these large and complex organizations as stakeholders.

Surface waters and groundwaters of the catchment supply numerous ponds used for fish farming. While being a potential stakeholder, the fish farmers are focused on water quality issues, which they perceive as related to occasional chemical spills or dissolved oxygen depletions.

The most important stakeholder in the case study area is the Water and Sewage System Company of the Częstochowa District - Joint Stock Company (http://www.pwik.czest.pl/en). The company supplied drinking water to 300 000 inhabitants of the region. Personal contacts with the representatives of this stakeholder were maintained since the beginning of the WATERLINE project and resulted in a meeting in January 2023 at which the stakeholder needs were precisely formulated and future collaboration was outlined. The needs of the stakeholder are at least twofold:

- Further development of the numerical model of groundwater flow and solute transport that is a crucial tool in the management of groundwater resources of the area. The model development is linked to the scope and objectives of WATERLINE through the need to better assess infiltration to groundwater, which relies on the knowledge of spatial and temporal patterns of precipitation, evapotranspiration and soil moisture available from remote sensing.
- Tools to assist retrieval, storage and preprocessing of hydrological data. This requirement will be met by developing a web application. According to stakeholder’s view the development of such an integrated hydrological data-handling system might be useful for and bring attention of other waterworks in Poland.

To sum up, two groups of stakeholders with different needs emerge from the above analysis:

- The Water Company and farmers for whom an integrated web tool might provide easy access to information derived from ground-based observations, satellite products and other sources.

- Anglers and the water management authorities who might rather benefit from drone-based observations of river channels and their adjacent areas.

4.3 The Finish study area

Following our meeting with stakeholder in 2021, we have close communication with them during 2022 and agreed to install sensors and monitoring system on their properties.

A technical committee was framed at the University of Oulu which consists of professors, research scholars, postdoctoral researchers, and lab technicians to accomplish the stakeholder's involvement in the development of extensive field monitoring system across the Temmesjoki basin. From our university, a technical team consists of agricultural, water resource engineers, local language experts and lab technicians were continuously involved in various processes shown in Figure 1.

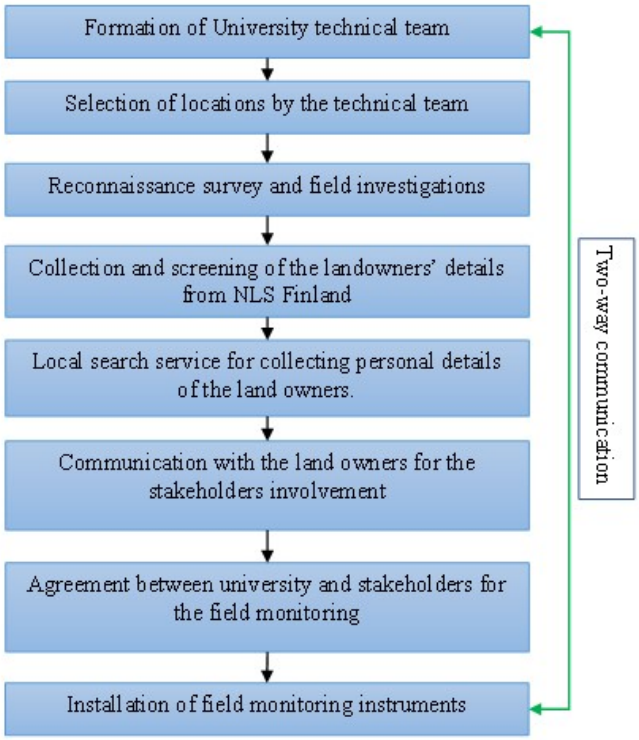

Fig 1. Stakeholder comunication process in Temmes joki basin, for instaling the sensors and monitoring the basin

Our plan was to develop an extensive network of various field monitoring for the hydrological modeling development and uncertainty reductions in the process. A detailed plan was prepared for developing soil moisture sensors network, groundwater level monitoring network, and discharge collection network across the Temmesjoki basin. Initial locations for the soil moisture were selected based on the Land Use and Land Cover distribution and soil profile data of the basin. We wanted to collect the soil moisture data that represents the major LULC types of the basin (Forest, Agriculture, and grassland). 20 locations were chosen based on this criterion before the reconnaissance survey. Field investigation and reconnaissance survey of the technical team visited the selected locations to identify the properties for acquiring the permission with the property owners. During the field visit our team found difficulty in reaching many locations due to various restrictions such as unavailability of road, very interior places, wet conditions, private properties. So, during the visits, in suitable places soil profiles were verified for the suitability of the sensor installations. Location details such as latitude and longitude of the locations were identified using the hand GPS. Later, this information was used to get the property details check using the NLS Finland, and Google earth engine. Property codes are retrieved and used to collect the paid E-service of the NLS Finland to get the property details such as owners names and addresses of 30 locations. Finally, the property details are used for collecting the personal information such as mobile numbers, email addresses using information collecting companies such as Fonecta, and Finder. After collection of these information our team were involved in communicating the owners regarding the plans for field monitoring and acquired permission for the same through emails and calls. Regular communication between us helps to improve the coordination for the field monitoring.

We plan the last meeting with stakeholder for waterline project in following Autumn.

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