Small systems, big challenges

How WaterQ solution can improve management of small drinking water supplies

Zagreb

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Content

1 Small drinking water supply

PROBLEM

2 Small drinking water supply

SOLUTION AT NATIONAL LEVEL

3 Small drinking water supply

SOLUTION AT SUPPLY LEVEL

1

Small drinking water supply

PROBLEM

Small drinking water supplies (SDWS) are a dominant type of water supply in rural and remote areas

EU definition:

Small drinking water supplies are defined as supplies serving up to 5,000 persons or supplying up to 1,000 m^3 water per day[2]

Other terms used: small-scale water supply (WHO)

Two main management types:

Community-managed supplies: systems administered and managed in self-responsibility by the community members

Public supplies: systems administered and managed by a distinct public entity (e.g. company, municipality, water board association)

207M or 23% of population[1] served by SDWSs in the WHO European Region

On average 10-30% of population[1] served by SDWSs (depending on the % of rural population and country-specific)

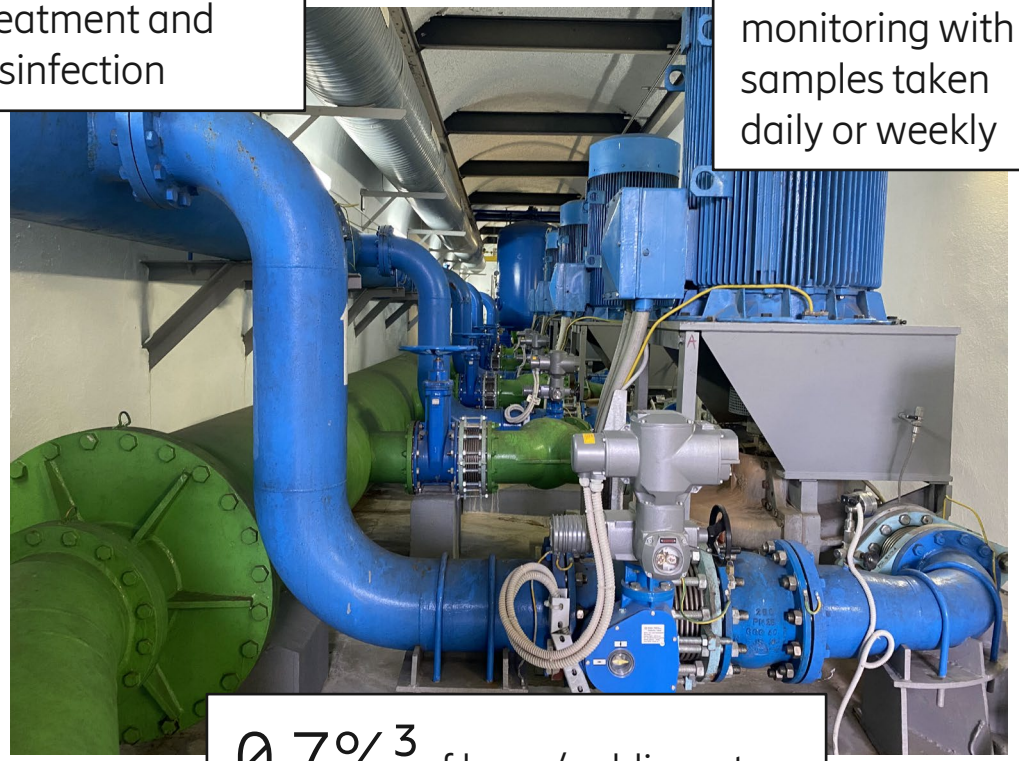
65M or 14.5% of EU population[2] served by SDWSs

[1] Status of small-scale water supplies in the WHO European region.
WHO European region covers 53 countries in the area from Portugal to Kazakhstan
2 Framework for Action for the management of small drinking water supplies

Difference in compliance – water quality between large (public) and small water supplies puts citizens in rural and remote areas in a disadvantageous position

Advanced water treatment and disinfection

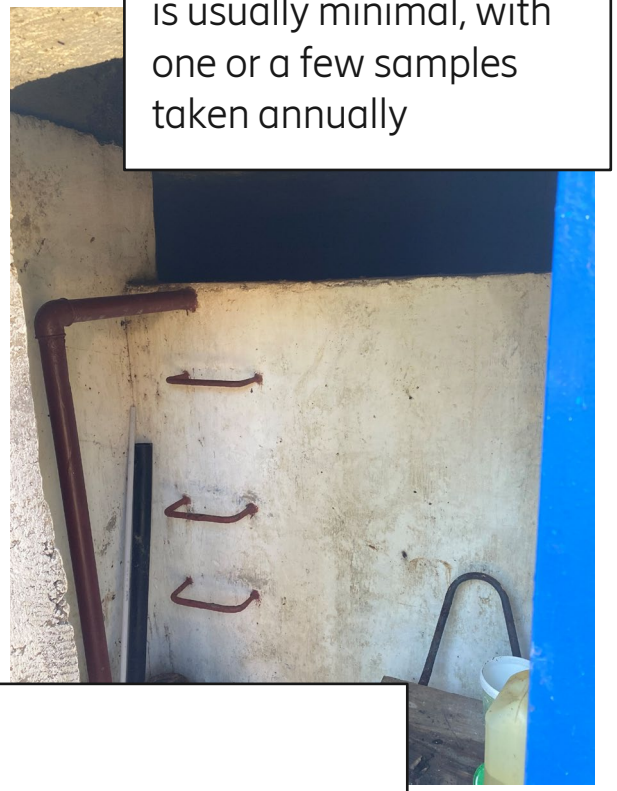
Regular quality monitoring with samples taken daily or weekly



0.7%[3] of large/public water supply samples indicate microbiological contamination

Water treatment and disinfection is often limited or non-existent

Water quality surveillance is usually minimal, with one or a few samples taken annually



37.1%[3] of community-managed small drinking water supply samples indicate microbiological contamination

[3] Examples from Croatian report on drinking water in 2021

SDWS specifics and risks call for a comprehensive approach to improving management and water quality

Regulation and organisation

- Not sufficiently addressed by water regulations
- Ownership is often unclear
- Financial resources are limited
- Non-professional staff

Pollution risks

- Ageing infrastructure
- Inadequate sanitation protection and practices
- Poor management of waste
- Vulnerability to heavy rainfall

Monitoring

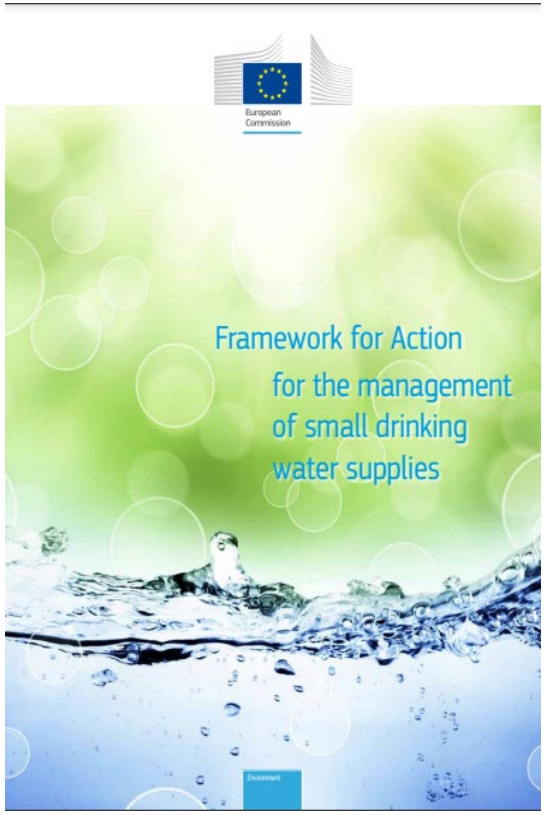
- Lack of baseline data about SWDSs (location, ownership, management)
- Minimal monitoring data (usually one or a few samples taken annually)
- Missing routine data collection mechanisms
- Challenge of coordinating data collection at the national level so that data can be used for planning, regulation and corrective action

2

Small drinking water supply

SOLUTION AT NATIONAL LEVEL

EU-recommended solution for improving management of SDWSs at national level: introduction of a four-component risk-based approach



Register of water supplies

Build and maintain a register of water supplies: location, type and ownership of every water supply

Collecting information

Record specific information about each supply: size, population, source, treatment, sample analysis results

Risk assessment

Risk-assess each supply based on its characteristics and parameters which are higher/lower risk

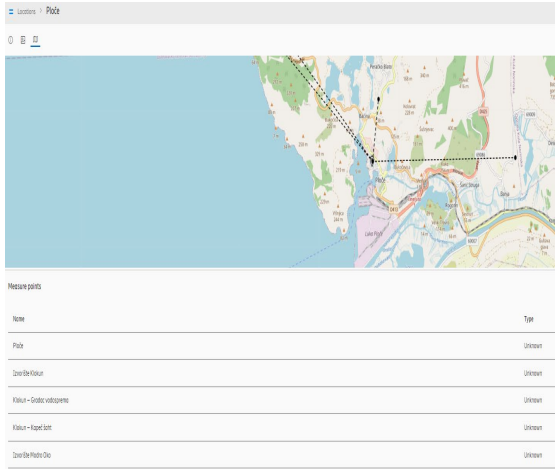
Reporting

Implement national and transparent reporting on both small and large water supplies

WHO recommends establishing national registers of small-scale water supplies and routine data collection mechanisms as a solution to improve the evidence base and identify priority actions.

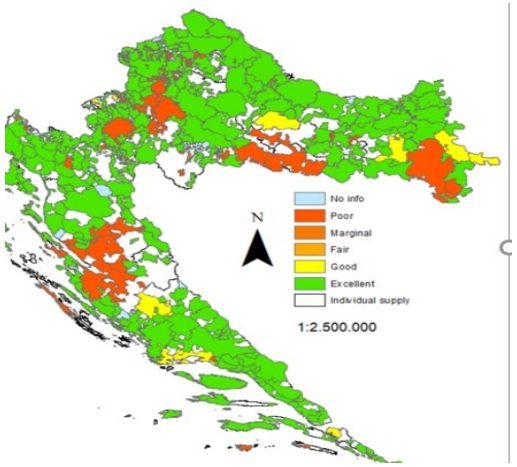
At national level, WaterQ provides a solution for all four key components needed to introduce risk-based management of the safety of SDWSs

Register of water supplies



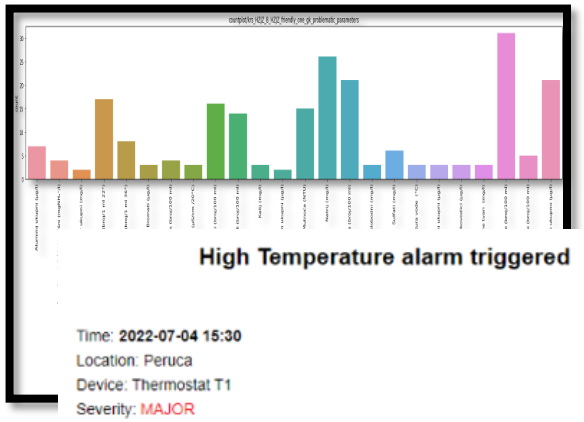
Digital platform with GIS and data component for establishing a national register

Collecting information



Data components (laboratory analyses, open data) and IoT sensors for routine (real-time) data collection

Risk assessment



Analytics component for monitoring optimization (focus on high-risk parameters) and early warning tools

Reporting

Visualization component for advance reporting and mobile application for easily accessible and user-friendly communication

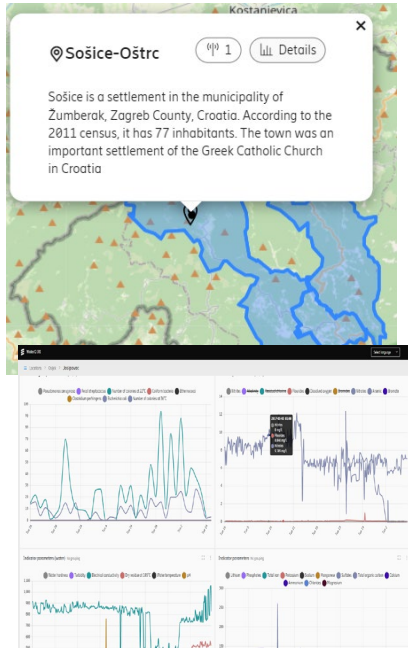
3

Small drinking water supply

SOLUTION AT SUPPLY LEVEL

At the level of each SDWS, WaterQ solution improves informed management and decision-making

Data collection (laboratory analyses, IoT measurements, weather open data) and **visualization** using a digital platform.



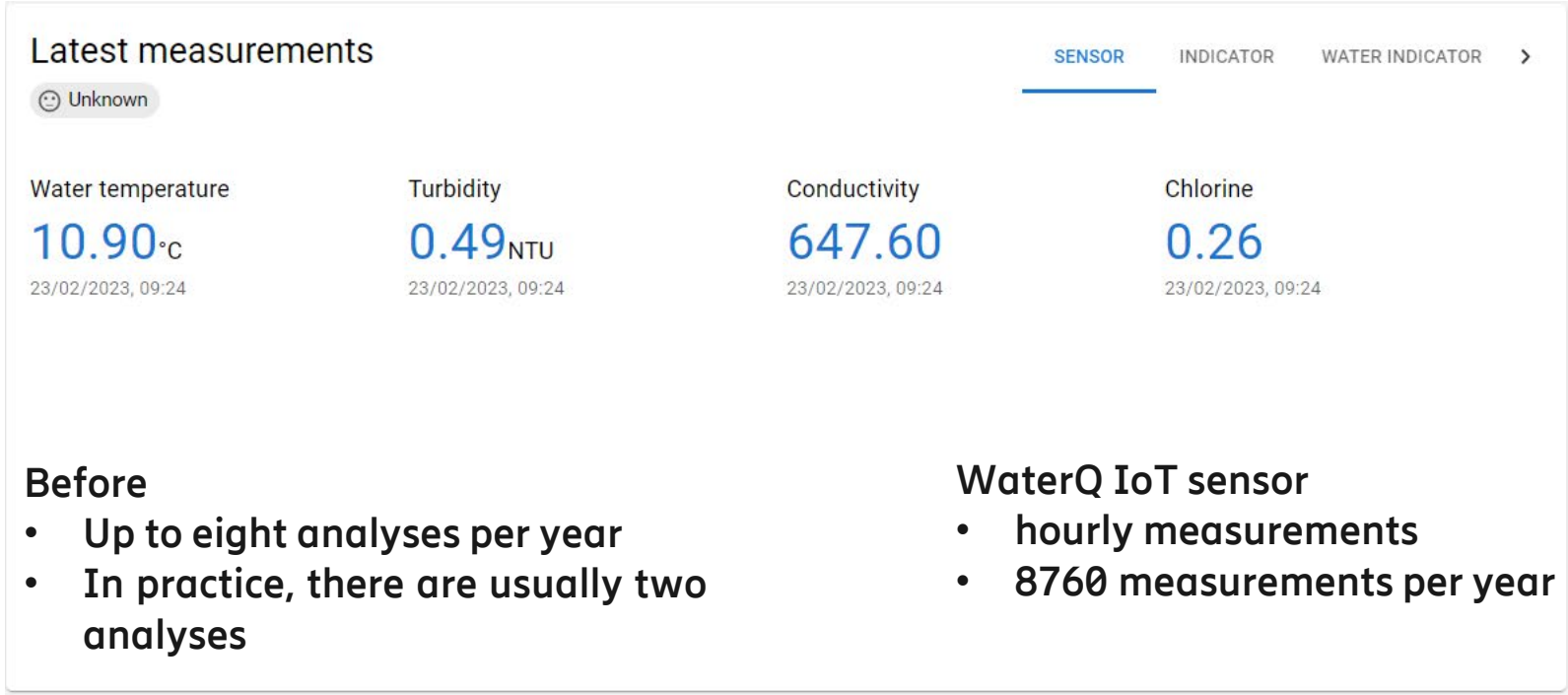
High Temperature alarm triggered

Time: **2022-07-04 15:30**
Location: Peruca
Device: Thermostat T1
Severity: MAJOR

Risk management with an **early warning system** for threshold **alert notifications** towards SDWS managers and consumers via mobile application.

Using IoT sensors for real-time monitoring of risk parameters (pH, turbidity, temperature, residual chlorine) **at different locations within the system** (source, reservoirs, pipes), i.e. from the source to the final consumer.

WaterQ solution enables easy collection of an incomparably greater amount of key information at the SDWS

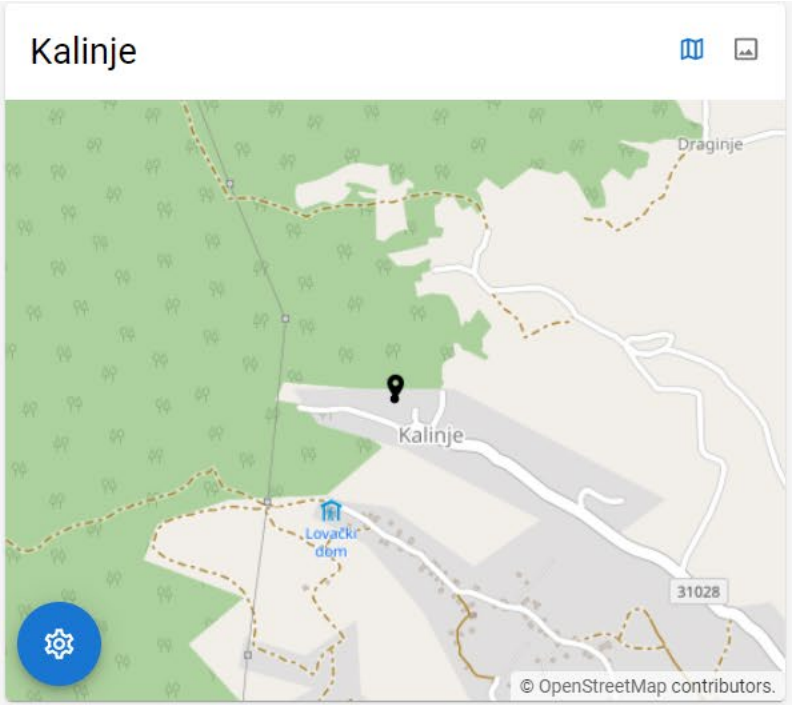


Before

- Up to eight analyses per year
- In practice, there are usually two analyses

WaterQ IoT sensor

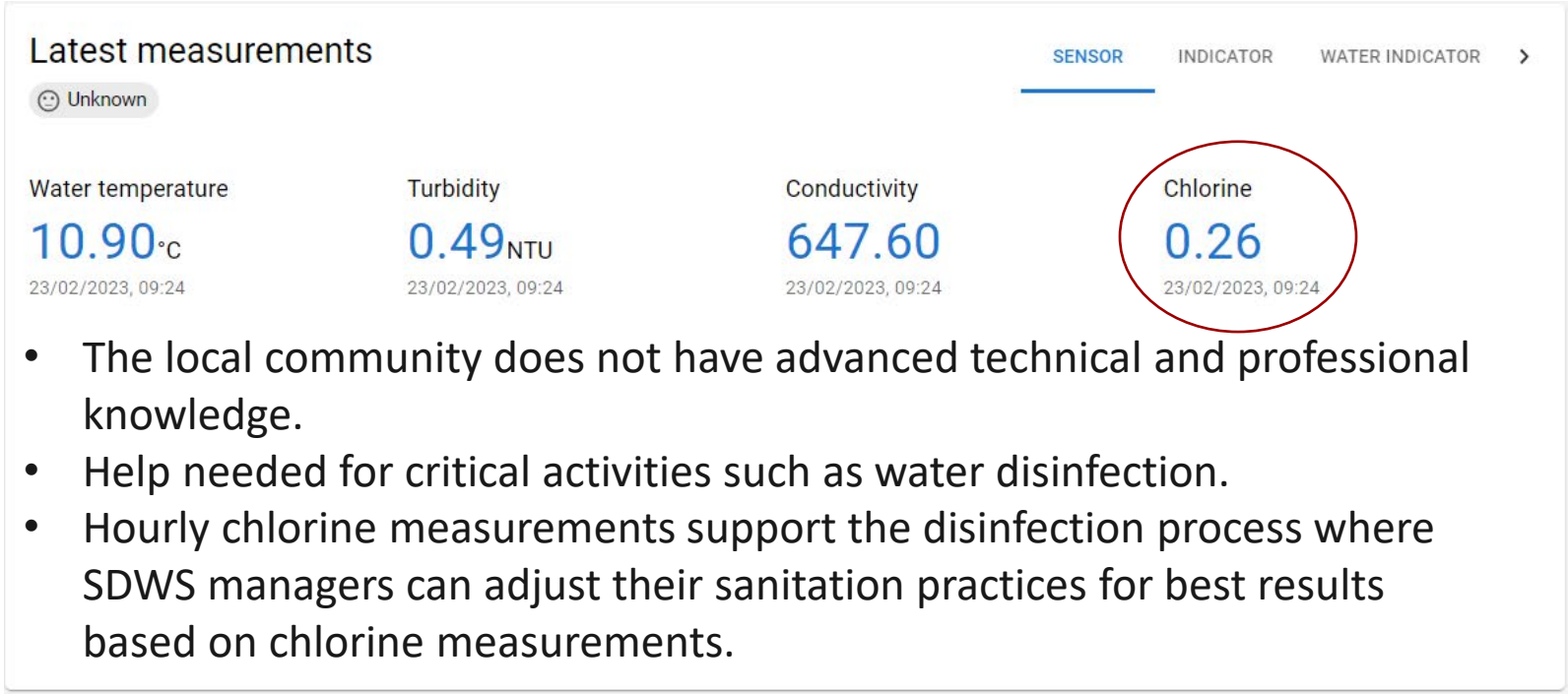
- hourly measurements
- 8760 measurements per year



The SDWS included in the WaterQ project became the SDWS with the most analyses and measurements in the Republic of Croatia.

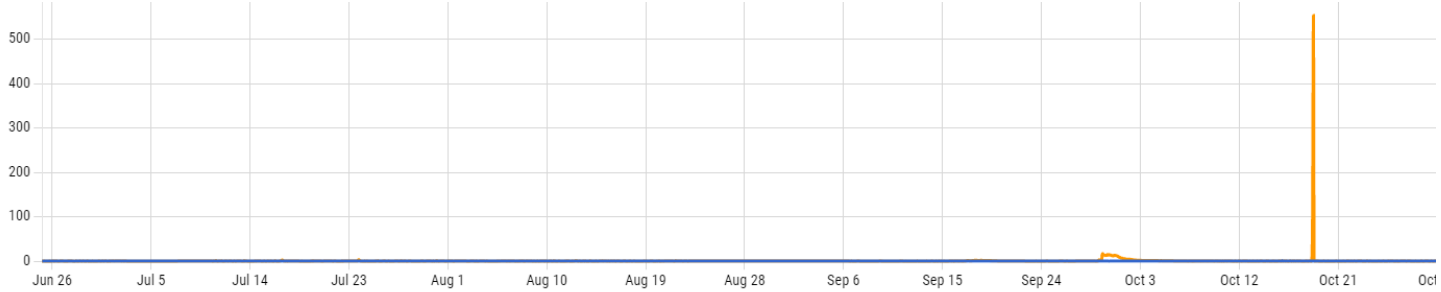
Through a digital platform and mobile application, all measurements are available to SDWS managers and the public health system in real time.

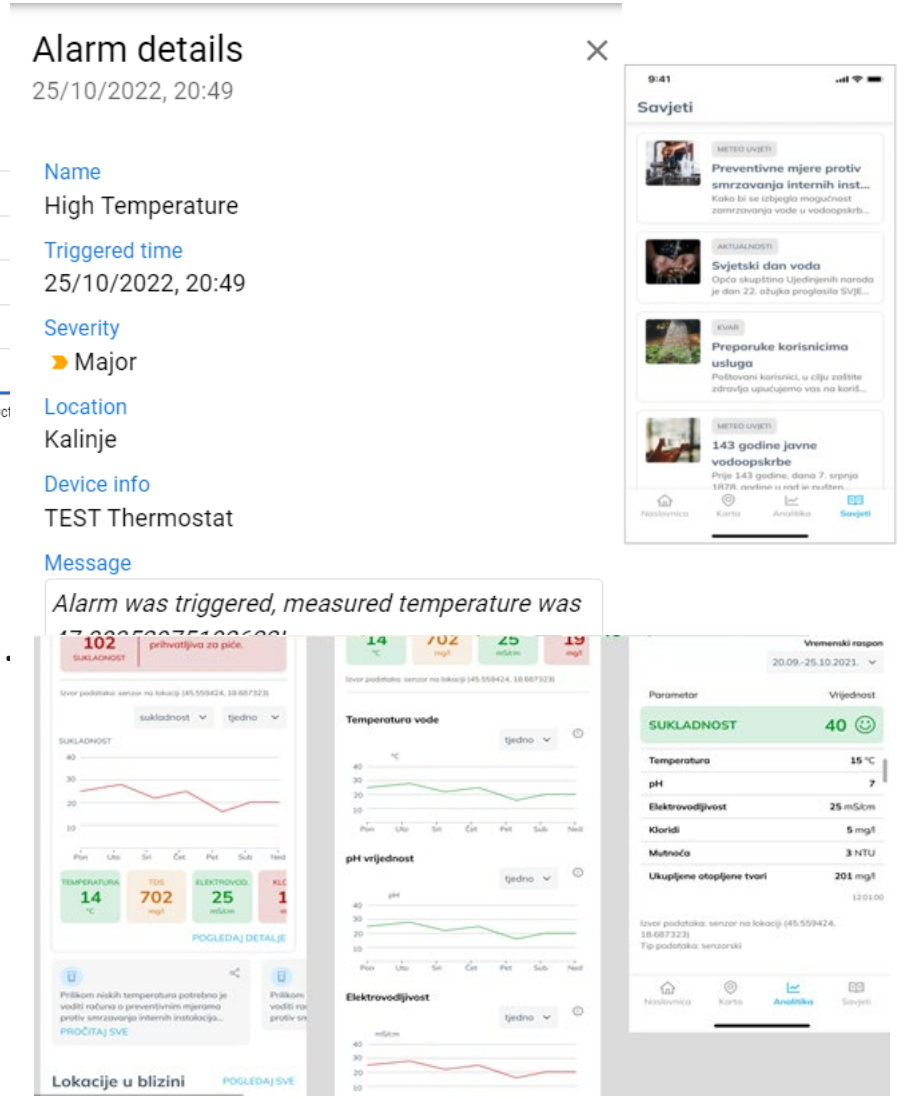
WaterQ solution provides assistance in managing critical processes such as disinfection



- The local community does not have advanced technical and professional knowledge.
- Help needed for critical activities such as water disinfection.
- Hourly chlorine measurements support the disinfection process where SDWS managers can adjust their sanitation practices for best results based on chlorine measurements.

WaterQ solution helps identify risks and sends an alarm in real time





- Incidents in water supply systems are sudden and are often identified only when waterborne diseases appear.
- The early warning system sends an alarm when limit values are exceeded.
- The WaterQ mobile app sends alerts and advice.
- Focus on easily accessible and understandable visuals and information in accordance with the recommendations of the EU Drinking Water Directive.