Let's shine a light on water

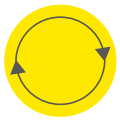
WHITEPAPER 0.4

September 2023

Why do we update our white paper?

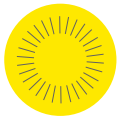
We learn through

modeling



feedback loops

reflections from stakeholders



new insights

expanding knowledge domain

white paper updates


aqa.earth
Let's shine
a light on water
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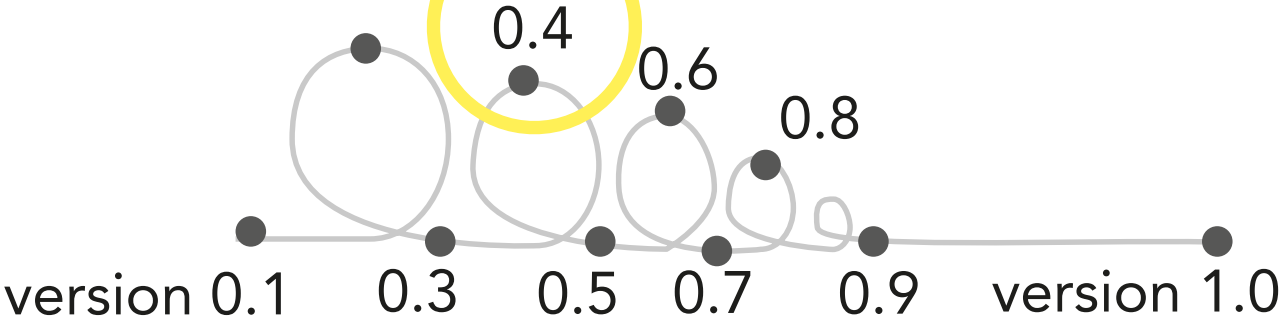
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Let's
shine
a light
on water

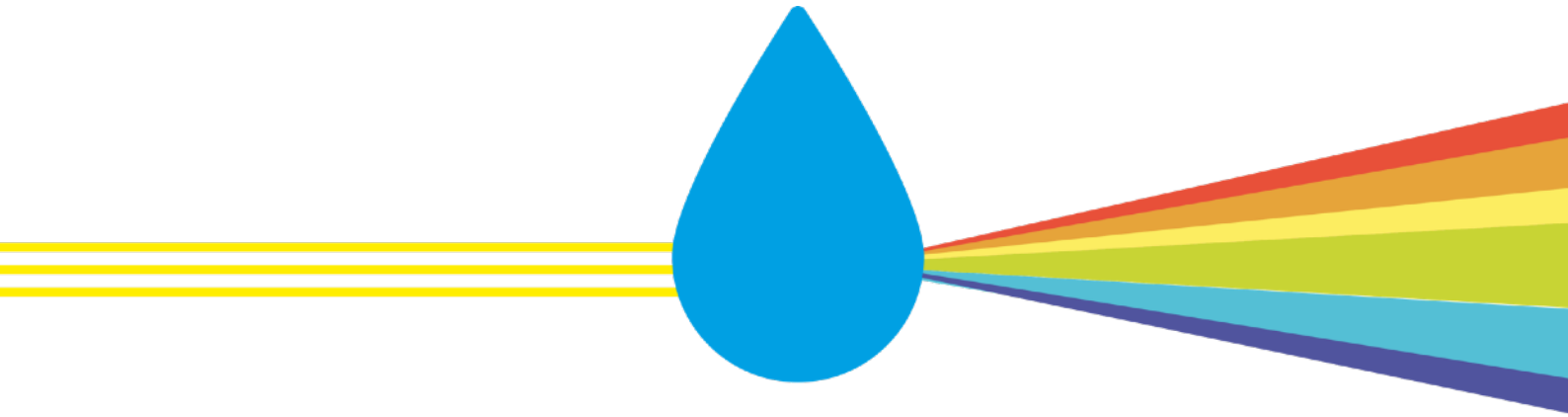
1. aqa.earth: let’s shine a light on water

Water is everywhere: in our bodies, drinking water systems, and the environment.

The quality of water affects almost all aspects of life. Our health, well-being, ecology, and economy thrive if our water is clean, fresh, and healthy.

Unfortunately, we are in the dark about the quality of water in our immediate environment, especially our surface water. We don't know about it, or we learn too late.
Our ignorance causes unbalanced ecosystems and the blooming of unwanted and toxic blue-green algae in our water for recreation and drinking water production. In areas where people rely on surface water quality, it may even result in public health issues and water scarcity.

Aqa.earth's mission is to collectively shine a light on water quality in our immediate living environment. Knowing the quality of the water helps us safeguard our collective health, ecology, and well-being.



2. our dream

Our dream is to improve the quality of our living environment through a community-driven ecosystem focusing on surface water. Citizens recognize the vital importance of clean water and will happily contribute to improving its quality. With this, we safeguard the use of our surface water as a natural resource for our drinking water and recreation.

More precisely, we aim to improve the quality and health of our living environment by promoting data-driven interventions resulting from the aqa.earth network, a privately owned and distributed global network of water quality sensors, both on land and in shallow water.

The aqa.earth network aims to:

Raise the awareness of water quality as a core indicator of the health of our living environment and planet.

Empower people to monitor and measure their land and local water quality.

Reward sensor owners for contributing water data to the global network.

Use water quality data to promote interventions of local governments to improve our shared living environment.

Facilitate a marketplace for real-time and historical water quality data and insights to different stakeholders.


Sensor owners
monitor the quality of
their water in real time

“Water is the driving force of all nature.”

Leonardo da Vinci

3. the importance of water quality

The surface water in our living environment is vital for our health and well-being and provides essential habitat for various plants and animals.

We use our surface water for recreation, such as swimming, sailing, and drinking water production. Unfortunately, the quality of our surface water is under continuous pressure, mainly because of our use of pharmaceuticals, pesticides, and plastics.

The primary source of pharmaceuticals in our surface water originates from flushing our toilets. The toilet water ends up in municipal wastewater treatment plants (MWTTPs), where the treatment plants biologically purify the water before being discharged to the surface water. Unfortunately, the biological process at MWTTPs is not sufficiently efficient to remove all medicine traces. As a result, the MWTTPs release many pharmaceuticals to the surface water through the effluent. The primary source of pesticides in our surface water is agriculture for crop protection. Traces of these pesticides are extracted from the soil by rainwater and transported to the surface water.

Our use of plastics and the resulting plastic waste in our environment results in microplastics in surface water. Microplastics are small plastic particles originating from eroded and partially decomposed plastic waste.

Medicine traces, pesticides, and plastics are often called micropollutants since their presence is in micrograms or nanograms per liter of water. Micropollutants may seriously affect the metabolism of humans and other living organisms since a number of these components and their metabolites appear to interfere with, amongst others, hormone balances.

Over the past two decades, it has become clear that we need to pay more attention to improving the quality of our surface water since the micropollutants in our surface water are only partially removed during the drinking water production process. As a result, increasing levels of micropollutants affect our health.

The importance of suitable surface water quality is internationally recognized. In 2000, the EU adopted the EU Water Framework Directive (WFD). The WFD comprises a timetable for the stepwise realization of water quality improvement steps to be executed by 2033.

Besides micropollutants, high nutrient concentrations in the water, such as ammonium ions, phosphate ions, and nitrates, may seriously affect water quality. These components originate from manure and fertilizer used in agriculture and other organic waste materials ending up in our surface water during periods of rain.

A high concentration of nutrients in surface water results in excessive growth of algae and cyanobacteria, often called blue-green algae. As a result, the biological equilibrium in the water is disturbed, which may result in the excessive dying of fish and other aquatic organisms due to periods of low oxygen concentration in the water. Additionally, the blue-green algae may produce toxins and taste-and-odor compounds that may cause serious public health concerns and substantial economic damage in recreation areas since people cannot recreate in the water during an algae bloom.

High concentrations of nutrients in surface water increase the risk of blue-green algae bloom and high concentrations of harmful bacteria to public health, such as escherichia coli and intestinal enterococci. Recent research reveals that high nutrient concentrations in the water promote algal and bacterial growth and that their growth mechanisms are interrelated. As a result, the bloom of blue-green algae is also an indicator of other harmful micro-organisms in surface water.

To summarize, it is essential for our health, well-being, and environment to safeguard our surface water quality. Important points of attention are the micropollutants and large amounts of nutrients currently accumulating in our environment and surface water due to our human footprint.

3.1 measuring water quality

Although our surface water is vital for public health and our environment, more information is needed on its quality.

The first important step in improving the quality of our surface water is to identify the areas of low water quality. Identifying these areas will create awareness of

environmental issues and help us find local contamination sources to tackle each problem at its source.

As explained previously, we have two significant points of attention concerning the origin of low surface water quality:
- The concentrations of micropollutants in the water.
- The concentrations of nutrients in the water.

Ideally, we would like to monitor the surface water quality in real-time and inline through a well-distributed global network of sensors that measure precisely the concentration of micropollutants and nutrients in the water of concern.

Unfortunately, the measurement and identification of micropollutants require costly analytical laboratory equipment and offline sample analysis. The labour cost for taking samples, the analysis cost, and the analysis time are prohibitive for creating an effective sensor network.

Sensors for measuring real-time and inline the concentrations of nutrients in the water, i.e., ammonium ions, phosphate ions, and nitrate ions, do exist. However, sensor cost and maintenance are prohibitive for realizing a global sensor network.

The aqa.earth ecosystem deals with these issues through sensor fusion.

Sensor fusion:
the aqa.earth network combines several relatively affordable and straightforward sensors in different devices, applies many of these devices in a sensor network, and uses the data generated with an algorithm to determine the local surface water quality in real-time inline.

4. the aqa.earth ecosystem

4.1 fusion of three domains of technology

aqa.earth is based on the latest generation of sensor technology, data analysis, and blockchain technology. Figure 1 shows a schematic overview of the aqa.earth ecosystem.
The aqa.earth ecosystem consists of three integral parts that work together:

aqa.data

Aqa.earth aims to shine a light on water quality in our living environment by providing cutting-edge data visualization and water quality analysis through sensor fusion.

Mobile app
A mobile app for sensor owners gives a simple readout of the sensor.

Dashboard
Aqa.earth is giving value to local stakeholders by providing them with a dashboard. The dashboard gives local water-related insights based on the data of sensors in the area and several algorithms.

aqa.sensor

Shining a light on water quality refers to our robust sensor technology for measuring surface water quality using different wavelengths (colors) of light. The aqa.earth sensors use light to measure and create a fingerprint of the water quality. We give meaning to the raw data through sensor data fusion algorithms. Aqa.earth designs the sensors in-house and controls all the specifications of the current and future sensors. This design and engineering capability enable us to anticipate future needs from the network.

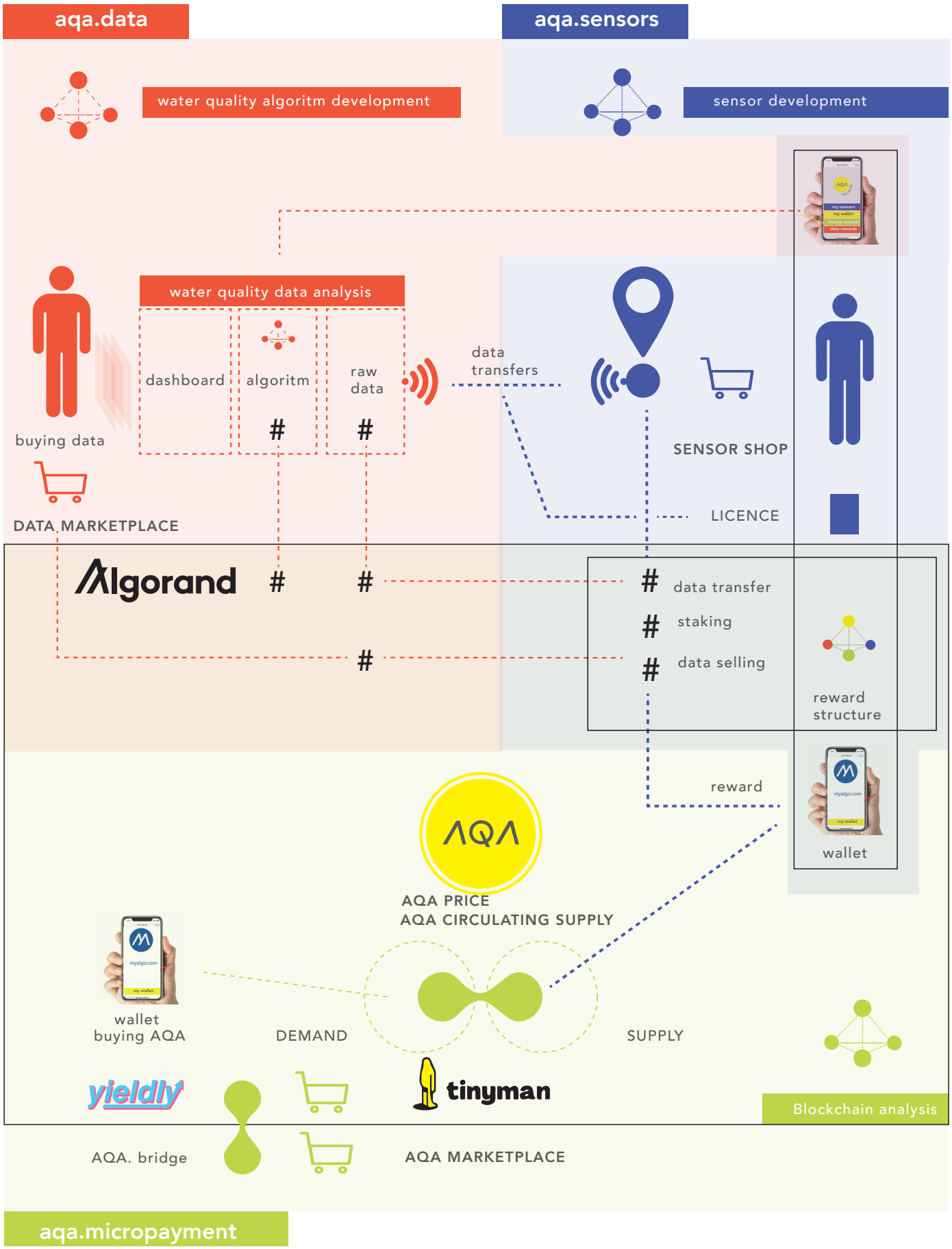


Figure 1. The aqa.earth ecosystem.

aqa.micropayment

The aqa.earth network uses blockchain technologies to facilitate the immutability of the data and organize the value flow to local sensor owners who provide sensor investment and contribute data to the network.

The aqa.earth network participants, i.e. sensor owners and investors, determine the economic and social value of the aqa.earth network.

Aqa.earth will initially reward sensor owners for building the network and, over time, for data delivery to the network. Owning an active sensor in the network is enough to be rewarded with the AQA token.

The growth of the network, both in density and size, will provide a shift from rewards for owning a sensor towards rewards for data delivery. During this shift, the sensor owners become data providers to stakeholders interested in the water quality data. Aqa.earth will actively sell water quality data to stakeholders. Sensor owners will benefit directly from these sales: they will receive 75% of all sales created with data they provide to the network.

We provide all the incentives through our aqa.earth token, the AQA.

4.2 contribution of water knowledge institutes

The aqa.earth ecosystem works closely with knowledge institutes like Wetsus and universities, local municipalities, and companies. This will result in joint data analysis efforts to understand our ecosystem better. Also, these cooperations will lead to new insights into the need for water quality data and help the knowledge institutes define knowledge gaps, resulting in new R&D projects. To catalyze this innovation process, aqa.earth became a member of the Wetsus Sensoring theme in February 2023.

As a result, aqa.earth can continuously improve its underlying sensor fusion algorithms to maximize data relevance and value for potential stakeholders who buy water quality data. In other words, we use the latest algorithms to look at current and historical data.

wetsus
european centre of excellence
for sustainable water technology

Wetsus, European centre of excellence for sustainable water technology.

4.3 community-driven ecosystem

We are building the foundational structure of sensor owners through a sense of community. We make water quality a local concern by giving local custodians the proper monitoring tools (sensors) and rewarding them for sharing the data. This approach will empower the community to stand firm to promote policy change, all based on sound data.

We aim to create a highly functional and stable aqa.earth platform with a micro-economy around the sensor network and water quality data.

community by goal
a group of people that care about the same goal, real-time and inline.

community by share
a social group of any size whose members reside in a specific locality, share government, and often have a common cultural and historical heritage.

community by care
a group of people that care about each other and feel they belong together.

4.4 immutability of the ecosystem

We took several measures to ensure the quality, security, and consistency of the aqa.data, aqa.sensors, and aqa.micropayment domains.

aqa.data

- Each sensor sends encrypted data packages containing a unique sensor code, the GPS coordinates of the sensor location, and the sensor data to our servers. Our servers attach a time stamp to the data and add them to the database.
- Encrypted versions of the aqa.earth databases are stored on our servers and as a backup on the Sia, Filecoin, or similar decentralized data storage.
- A hash of the data is stored on a regular basis in the Algorand blockchain.

aqa.sensors

- Our sensors are produced, tested, and approved in-house.
- The printed circuit boards are encapsulated in a resin to protect against moisture and cannot be changed.
- The software in the sensors cannot be modified.

aqa.micropayment

- We use the Algorand blockchain as the environment for our token, ensuring safe and environmentally friendly transactions at manageable transaction costs.
- Sensor owners receive their AQA token rewards by supplying us with an Algorand receiving address.
- At the start of the network, Aqa.earth will make AQA tokens (token ID 781829486 on the Algo blockchain) available on the Tinyman DEX through an AQA – Algo pool created with Algo and AQA tokens owned by Aqa.earth.

4.5 future proof by design

The aqa.earth network is future-proof by design.
Through analysis of our data and our cooperation with knowledge institutes, we'll obtain new insights that we can implement in our data sensor fusion algorithms. This will enable us to improve predictions of existing water quality parameters and predict new ones.
New insights will also demand new sensors measuring additional parameters such as dissolved oxygen, pH, and ORP (redox potential). Since we design, develop, certify, and produce all aqa.earth sensors in-house, we can anticipate demand for new sensors affordably at a very early stage.
Our mechanism to reward sensor owners with AQA tokens also anticipates the introduction of new sensors to support the aqa.earth network: the sensor rewards per invested euro are the same for all sensors in the network.

As the aqa.earth network grows, the data sales increase, and the data sharing rewards decrease. This will result in a smooth transition of the network from data sharing rewards towards data rewards and a steady rise in the total value of the network.

A growing issue on the market is the scarcity of personnel and production capacity of electronic parts. In addition to this, we are confronted with disturbed supply chains due to several societal developments.

Aqa.earth anticipates on all these issues by developing and producing all software and hardware in-house. In all our hardware designs, we might need to switch to alternative electronic parts due to long lead times or scarcity on the market.

The founders of aqa.earth erected this initiative through their investments. This gives us the time to build the network in an optimum way and to grow organically.

5. aqa.data

In this section, we'll explain the data flows in the aqa.earth ecosystem for monitoring the water quality and generating alerts, benchmarking the water quality, and predicting the water quality.

Figure 2 gives an overview of the aqa.earth ecosystem for monitoring the water quality and generating alerts, benchmarking the water quality, and predicting the water quality.

5.1 the main water issues

The aqa.earth network comprises a database with history and real-time sensor data on soil and water quality parameters, translated by sensor fusion algorithms to quality parameters of our living environment with societal impact.

The main water quality issues that affect our living environment and that we shine a light on are:

- Water scarcity.
- The drought of soil.
- Over-fertilization of the soil.
- Local blue-green algae blooms related to public health issues in surface water.
- Local washout of nutrients.
- Wastewater discharge.
- Swimming water quality of natural water sources like rivers and lakes.

5.2 external data from different sources

The surface water quality is monitored at many places by so-called water boards or water authorities. We are evaluating external water quality data sources in the EU.

In The Netherlands, external water quality data sources are publicly available through the “Informatiehuis Water” organization at Amersfoort. An increasing

amount of these water quality data are geo-tagged, and we will include them as a layer in our aqa.earth maps and analyses.

We will also use external sources like weather, population, and geo data. We will use the different data sources in data fusion models to generate insights.

5.3 data for different stakeholders

The aqa.earth network provides data and insights for different stakeholders.

1. Individually checking our water quality

As individuals, we have a tool to monitor the water quality in our living environment, answering questions such as: Is the local water quality increasing or decreasing? How and when do I water my garden?
We address these values by providing a simple mobile application to sensor owners that communicates the quality and safety of their water of interest. The significance, meaning, and accuracy of the data will increase as the network grows.

2. Collectively promoting good water quality

Besides the value of personal monitoring, the shared tracking will provide fact-based arguments to promote interventions beyond the individual towards local government, for example, in case of a structurally low surface water quality in certain areas. In other words, the sensor network will help create awareness among citizens on which places we should focus to improve our surface water quality. This knowledge will empower citizens to stimulate the local government to take action.
We address these values by providing a simple web / mobile application that communicates the quality and safety of the water in an area.

3. Responsible care

Businesses have a responsibility toward society to minimize the impact of their operations on the quality of our surface water.
Businesses must minimize their energy and raw material footprint and ensure that their water purge to the environment is clean and as small as possible. The sensor network allows business owners such as farmers, horticulturists, and manufacturers to show the positive results of their environmentally friendly operations on local water quality transparently and objectively.

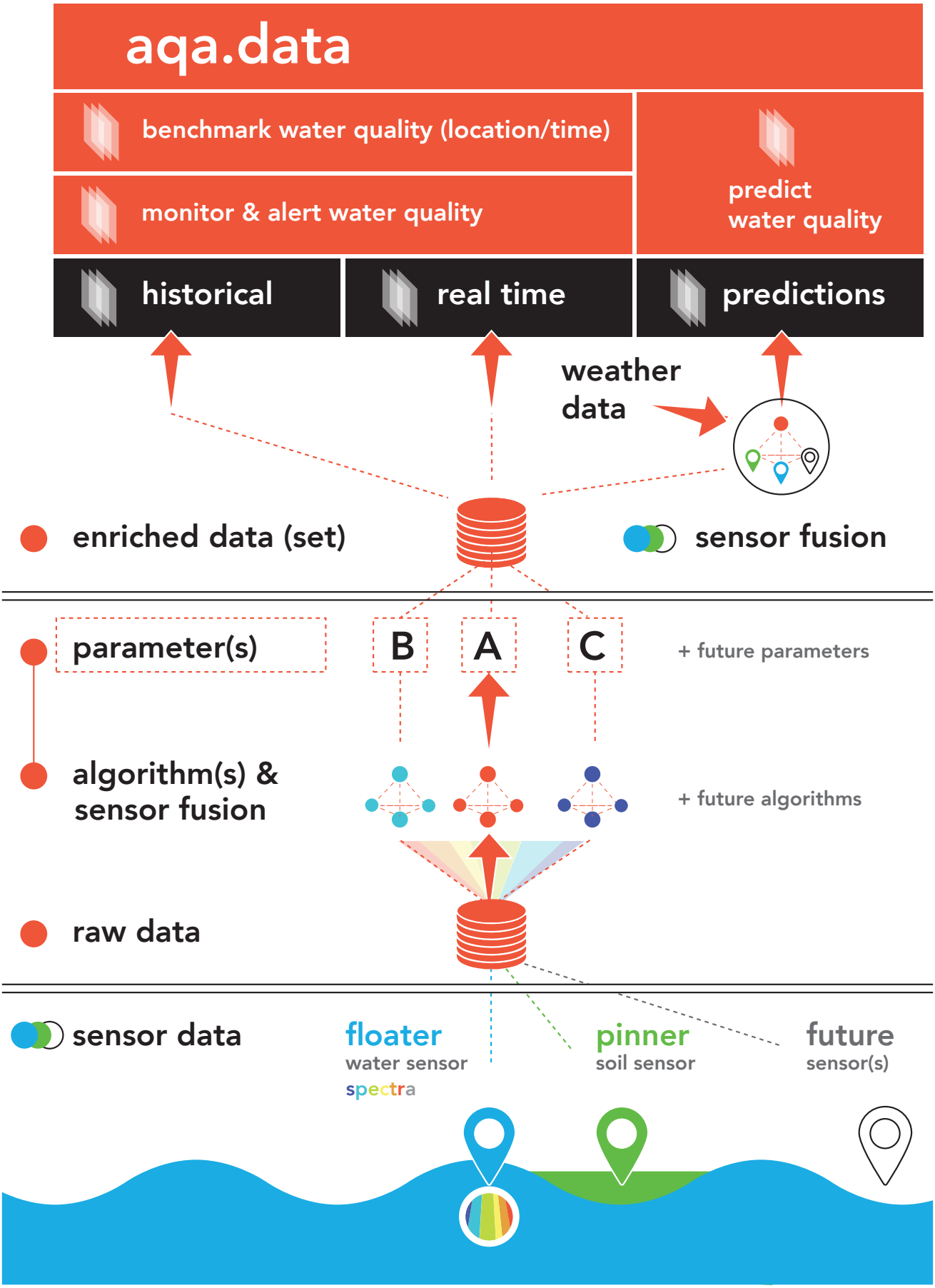


Figure 2. Data flows in the aqa.earth ecosystem for monitoring the water quality and generating alerts, benchmarking the water quality, and predicting the water quality.

Local governments can use the sensor network to monitor the efficiency of their operations, for example, by measuring the water quality of the effluent of their municipal wastewater treatment plants or surface water. Additionally, governments can use the network to check if local businesses meet government regulations.

4. Understanding human-environment interactions
It is a worldwide issue that only very little information is available on local surface water quality. As a result, we only have limited knowledge of the impact of human activity on local surface water quality. The sensor network will be an effective tool for knowledge institutes and scientists to study the influence of human activity on local water quality and identify areas of attention and knowledge gaps for future research.

5.4 data dashboard

Figure 3 shows a dashboard for a public health issue-based representation of sensor fusion data.

Stakeholders like waterboards, municipalities, water purification companies, municipal wastewater treatment plants, farmers, horticulturists, and knowledge institutes can benefit from and contribute to the aqa.earth network through a data subscription for these areas of interest.

Aqa.earth provides these parties with data to monitor, alert, and improve water quality. Local parties can use this data to evaluate regional policies and interventions to improve the living environment and well-being and communicate the water quality to local communities.

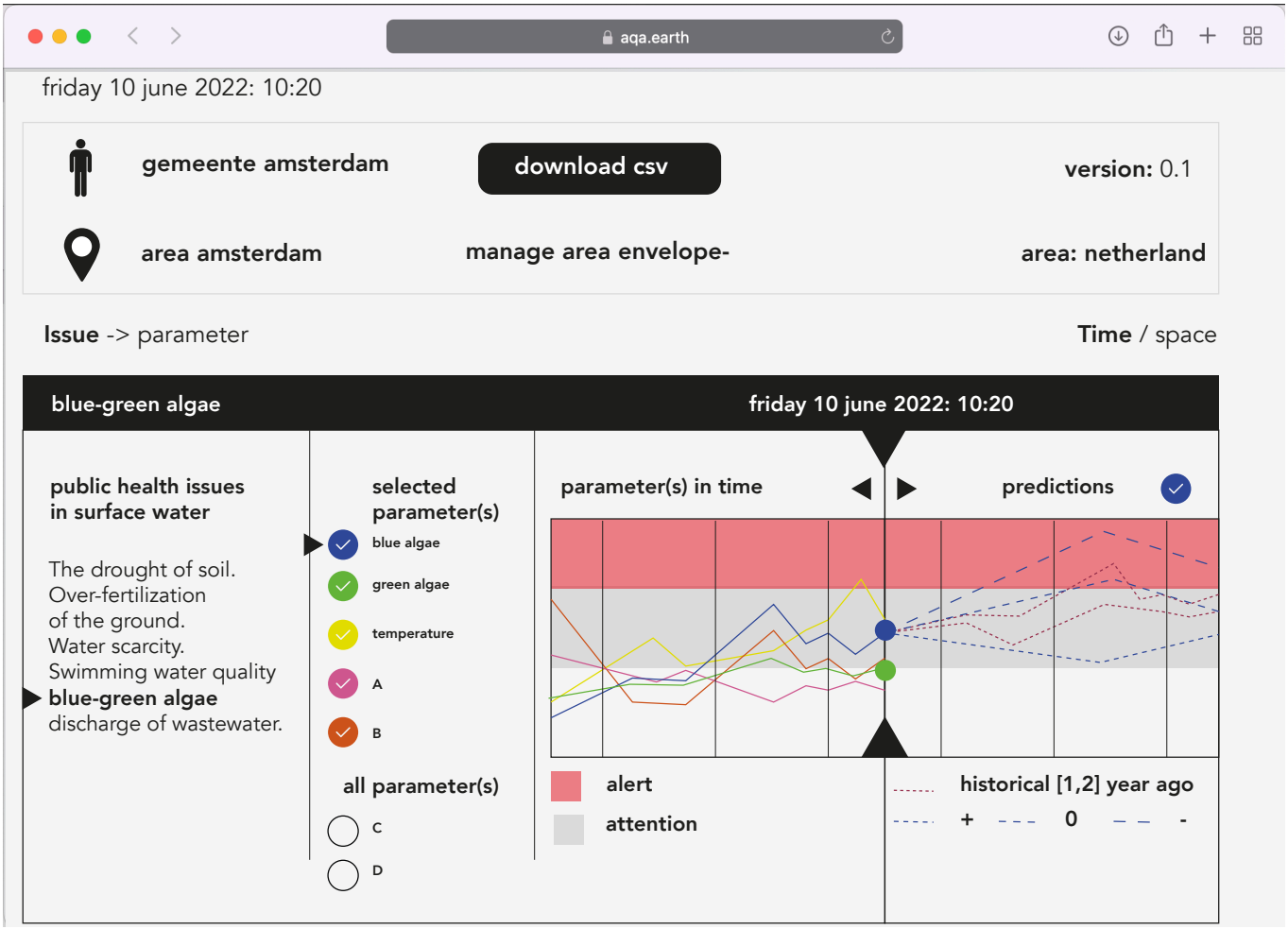


Figure 3. Screenshot of a dashboard for a public health issue-based representation of sensor fusion data.

monitor & alert

The aqa.earth network monitors the quality of our living environment. It generates early warning signals if the quality of a local living environment decreases or deviates significantly from benchmark areas.

The aqa.earth network comprises a database with history and real-time sensor data on soil and water quality parameters translated by sensor fusion algorithms to quality parameters of our living environment with societal impact.

benchmark

The aqa.earth network makes it possible to benchmark your local situation with other areas or with your own area at another time. It is an ideal tool to help your organization evaluate local water quality policies.

predictions

Predicting specific parameters based on sensor fusion in combination with external data is possible. The process of predicting requires an ongoing learning curve. We'll present the predictions as an envelope with a likelihood ranging from uncertain to very likely. The more sensor data, the better it is to use historical learnings to predict a future parameter.

5.5 data storage and analysis

data storage

The aqa.earth network sensors store the generated data, i.e., the raw data in a database. Sensor fusion algorithms aggregate the sensor data into parameters of societal interest, such as overall water quality, water scarcity, areas with high blue-green algae concentrations, and areas with good swimming water quality.

We will gain more knowledge as the network grows, resulting in better sensor fusion algorithms that draw more detailed and accurate conclusions from the same data. For this reason, not only the raw data but also the maturity of the sensor fusion algorithms interpret the data and describe its value at any moment in time.

We store the raw data collected by the sensors as well as the version of the algorithms used for data interpretation in a database for several reasons:

- Historical data reveal the direction in which our living environments evolve. This way, we can proactively improve the quality of our surface water and anticipate water scarcity situations.

- Historical data help us better understand the parameters affecting the quality of our surface water and make water quality forecasts.

- Businesses and local governments can use the database to demonstrate responsible care for the local environment.

- Citizens can use the database to incentivize local governments to improve our shared living environment.

- Knowledge institutes can use the database to identify human activity that impacts our surface water quality. This knowledge helps them to define the focus of their innovation activities.

To secure the added value of the database, it should at least meet the following criteria:
- The data cannot be changed afterward.
- The data cannot be lost.

From an efficiency point of view, we choose to store the data elsewhere and prove the consistency of the data by regularly storing hashes of the collected data in the blockchain. This way, we ensure that the data are not altered afterward at minimum energy consumption, computing power, and storage capacity.

We choose the Algorand blockchain as a platform for the aqa.earth network to store the data hashes in a blockchain at the minimum ecological footprint.

algorithms and sensor fusion

We developed a strategy to monitor the surface water quality through sensor fusion.

The power of sensor fusion lies in the intelligent combination of different data sources of direct and indirect measurements by using an algorithm. This way, it is possible to indirectly measure quality parameters that can only be measured offline or at very high equipment and labour costs.

In a nutshell, the aqa.earth network combines several relatively affordable and straightforward sensors in different devices, applies many of these devices in a sensor network, and uses the data generated with an algorithm to determine the local surface water quality in real-time inline.

In our sensor fusion concept, we get nature's help by applying highly accurate algae sensors and an algorithm. For this, we use the observation that changes in the diversity and concentration of algal species in water strongly indicate changes in the concentration of micropollutants and the abundance of nutrients present in our lakes, rivers, ditches, and reservoirs.

Figure 4 gives a schematic overview of the intelligent combination of different sensor data sources in the aqa.earth network.

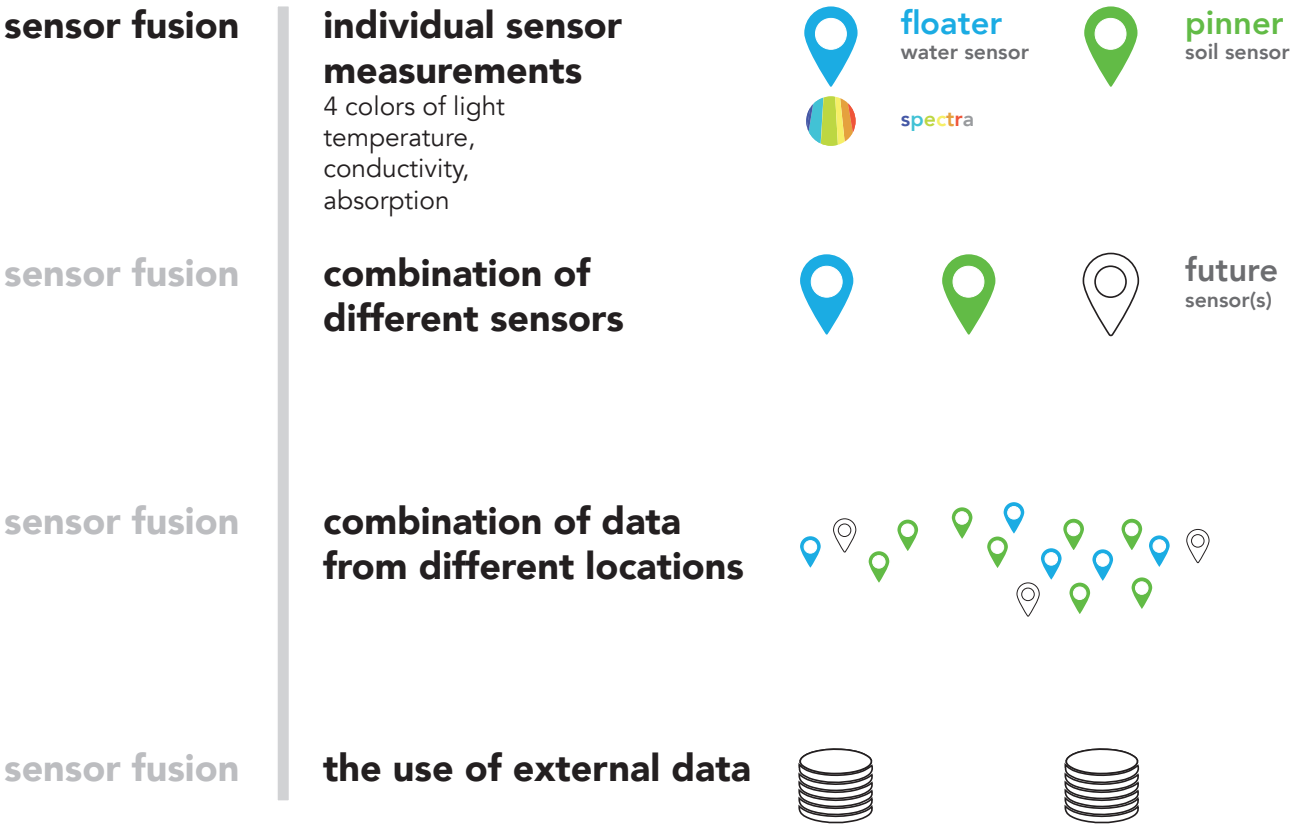


Figure 4. Different data sources are combined through an algorithm to determine the local surface water quality in real-time and inline.

As illustrated in Figure 4, the aqa.earth sensor network comprises four levels of detail in which we collect data:

individual sensor measurements:
Each sensor measures a carefully selected group of water quality-related parameters. Combining these parameters through an algorithm tells us something about local water quality. An example is a floater: it measures water temperature, conductivity, and light absorption in water at four wavelengths. The combination of high water temperature, i.e., temperatures above 20 degrees Celsius, high conductivity, and a rapid increase of blue and red light absorption are strong indications of the start of an algae bloom period.

combination of different sensors:
To further increase the predictive value of the aqa.earth sensor network, we combine different types of sensors through an algorithm. This approach provides us with more information on water quality than the situation where these sensors would be applied separately. An example is combining a pinner and a floater. With the pinner, we measure the soil moisture content, conductivity, air temperature, relative humidity, air pressure, and the concentration of volatile organic compounds (VOC).

We measure the soil moisture content and the concentration of nutrients in the soil through a single parameter: the impedance of the soil at an alternating current frequency of 1 kHz. In a stand-alone application, this approach brings along two practical problems:

- It is impossible to discriminate between a high soil moisture content with low conductivity and a low soil moisture content with high conductivity. Both situations may result in the same impedance measurement.

- It is impossible to discriminate between a high moisture content in the upper part of the soil and a high moisture content in the lower part since both moisture contents may result in the same impedance of the soil between the electrodes.

We solved this challenge through sensor data fusion: we combine our pinner measurements with the history file of publicly available weather conditions and the other measurements collected by the pinner. Through sensor data fusion, we can translate the impedance measurements of the pinner to the concentration of nutrients in the soil and the moisture contents in the upper and lower parts of the soil. This sensor data fusion approach enables us to affordably collect valuable information on our living environment.

With the floater, we measure, amongst others, the start of algae bloom. After a long period of drought, the pinner will measure a low soil moisture content and relatively high soil conductivity. During the period of drought, nutrients are not washed out from the soil and accumulate. In case of rainfall after a period of drought, the water flowing from the ground to the surface water will contain relatively high concentrations of nutrients and micropollutants.

Rainfall may result in a disturbed ecological equilibrium and algae bloom. In this case, the combined soil moisture history data and real-time floater measurements are strong indicators for an upcoming algae bloom.

combination of data from different locations:
The aqa.earth network measures water quality at local conditions. Many areas will have similar environmental conditions, resulting in comparable surface water qualities at these locations. Suppose we observe outliers in certain regions, i.e., significant differences between expected and measured water quality. In that case, we have a strong indication that something special is going on in those regions. This helps the local community to identify areas of low water quality in their neighbourhood, find its cause, and search for a solution.

the use of external data:
Aqa.earth can combine the data of the aqa.earth network with external data sources, such as data related to the presence of cities, villages, municipal wastewater treatment plants, industrial plants, livestock farming, agriculture, or horticulture. Also, information from satellites, weather stations, and data on human activity, such as traffic, may be precious for the aqa.earth network and its sensor fusion algorithms. The resulting knowledge makes it possible to identify the impact of different human activity hotspots on our local living environment. These hotspots define focus areas for knowledge institutes to develop technological innovations to improve our environment.

We apply floating devices in the water and soil moisture devices. Combining the sensor data with algorithms and external data makes it possible to obtain accurate information on the quality of surface water. It can eventually lead to forecasts based on the weather forecast. Additionally, the data can help us identify hotspots of poor water quality to focus on recovering ecological equilibrium in those areas.

6 aqa.sensor

6.1. sensor network

We apply floating devices placed in the water and soil moisture devices placed in the soil. Each sensor collects data and uploads these data to a central database.

We will start the aqa.earth network with the floater and the pinner.
We deliberately start with only two types of sensors we have extensively tested. That will provide us with valuable information to define the next growth steps of the network. Based on this insight, we will make an educated design of the sensor types needed in each development stage of the aqa.earth network and maximize sensor investment efficiency.

A consequence of our approach is that part of the aqa.earth sensors will be on the market briefly, and their token rewards are unknown to the early investors. As explained in the tokenomics section, we solved this challenge by giving all sensor owners the same token rewards per invested euro in the sensor, regardless of the type of sensor and sensor cost.

6.2 types of sensors

Figure 5 gives a schematic overview of the sensor types and their purpose.

We have three types of sensors, each with a different purpose:

the pinner:
This sensor measures the moisture/nutrients in the soil and some weather-related conditions, i.e., air temperature, pressure, relative humidity, and the amount of VOC (Volatile Organic Compounds) in the air. A data history file provides information on the quantity and conductivity of water transported to the surface. It is also a measure of the local scarcity of surface water. Additionally, the pinner offers information on the concentration of nutrients and micropollutants washed out or accumulated in the soil. This information is vital for conducting surface water quality forecasts based on expected weather conditions and the history file.

pinner
soil sensor

on startup

floater
water sensor

spectra

on startup

algae spotter
water sensor

spectra

2023

future sensor(s)

2024 and beyond

Figure 5, sensor types and their purpose.

the floater:
This device measures water temperature, the absorption of four different colors of light, and the conductivity of the water. Since various impurities in the water absorb different light colors, the color absorption measurements contain information on the water quality. The measurements with the floater provide information on the total amount of organic material in the water (Chemical Oxygen Demand, i.e., COD of the water), turbidity of the water and the concentration of chromophores, humic acids and algae. The conductivity measurements provide information on the concentration of nutrients in the water. We can predict the risk for algal growth through sensor fusion.

the algae spotter:
This sensor measures water temperature, water conductivity and the absorption of different colors of light, similarly to the floater.
Additionally, the Algae spotter measures the light emitted at a different wavelengths by different algae. The algae emit light at a wavelength different from the light that shines on the algae. This phenomenon is called fluorescence and makes it possible to determine the concentration of cyanobacteria (green-blue algae) and the presence of different algal species in the water.

Pinners and floaters at the same location, information on these devices at different locations, and external data will eventually provide accurate local surface water quality data. At a later stage, the Algae spotter will give valuable and vital information to validate the aqa.earth network.

All sensor devices are plug and play, connected through a SIM card provided by aqa.earth and automatically deliver their measurements to the aqa.earth network when installed. Citizens are empowered to measure their land and local water qualities, and aqa.earth rewards them in AQA tokens for sharing their data with the aqa.earth network.

6.3. sensor connectivity
We equipped the aqa.earth sensors with power and data connectivity. In this section, we'll briefly explain the connectivity of our sensors.

Power connectivity of the aqa.earth sensors
For many individuals, farmers, horticulturists, water purification and water quality monitoring companies, connecting the sensor to the national power grid is feasible.

For this reason, we supply a universal IP68 waterproof power supply along with the sensor.

For application in remote areas with no connection to the power grid, we developed a 20 Watt solar panel with a rechargeable battery. This sizeable remote power supply is a reliable power source for the sensors.

We realize that applying solar cells as a power source for the sensors results in additional costs. Also, we know that water quality measurements in remote areas provide fascinating ecological information to the aqa.earth network. For this reason, we decided to reward sensors powered with solar cells with extra data sharing rewards. The additional rewards scale with the investment cost in the solar panel. In other words, if you apply a sensor with a solar panel, your data-sharing rewards per invested euro in the sensor plus solar panel will be the same as when you apply a sensor and connect it to the public power grid.

Data connectivity of the aqa.earth sensors

To provide simple, robust sensors independent of other initiatives, generally applicable and plug & play, we decided to launch the aqa.earth network with SIM card connectivity.

The sensors are delivered with a 1-year license and data bundle to receive AQA rewards. After 1-year, sensor owners can optimally extend the license to receive AQA rewards (35 euros for 1-year). Sensor owners can stop mining and continue using the aqa.earth app. In that case, aqa.earth will pay for the data bundle and receive the data-sharing rewards for the sensor.

helium

synergy between the aqa.earth and Helium network

We identified an exciting synergy between the aqa.earth network, LoRa connectivity technology, and the Helium network. For this reason, we are working towards LoRa and Helium connectivity and expect to provide both LoRa and Helium-connected sensors in 2023.

In a nutshell, the Helium network is a community-driven, highly innovative IoT ecosystem for making devices connected. Unique about the system is that individuals purchase gateways, called hotspots, connect them to the internet and share the LoRa connectivity of these hotspots with the community. Neighbouring ones recognize hotspots and their owners; the Helium initiative rewards them with Helium tokens for sharing the connectivity with the community through a concept called PoC (Proof of Coverage).

6.4. smartphone camera as a sensor

During the test phase of our sensors, we took photos since they provide interesting background information on the local environment in which the sensors in the network are operating. When we compared the sensor data with the photos, we found out that most photos contain much information on local water quality. We then realized that cameras are a perfect fit in our community-driven sensor fusion concept.
To test our findings, we took about 1700 photos of different types of surface water in Friesland, a province in the North of the Netherlands and in Amersfoort. We also tested water samples at several of these locations with our floater and algae spotter.
We learned that algae blooms in surface water can often be recognized from a typical greenish watercolor in which green and blue-green algae may be present. The presence of dangerously high concentrations of blue-green algae can sometimes be recognized from floating brownish layers on the water surface with intensely colored blue-green spots.
The presence of too high concentrations of nutrients in the water can be recognized from the excessive growth of water plants, such as the partial or even complete coverage of the surface with duckweed.
Based on these exciting results, we developed an app (Android and iOS) to take surface water pictures and upload them to the aqa.earth network. The app automatically geo-tags every picture and makes it available on the “check your water quality map” of the aqa.earth website.

The app can be downloaded from Google Play or the Appstore. Anyone interested in contributing to the aqa.earth network can take surface water quality photos and send them to aqa.earth. This approach makes it possible to grow the network quickly, and at the same time, it provides focus to install sensors at locations with the most added value.

We are currently setting up school projects and asking for help from local fishing clubs, hiking clubs, and nature associations.

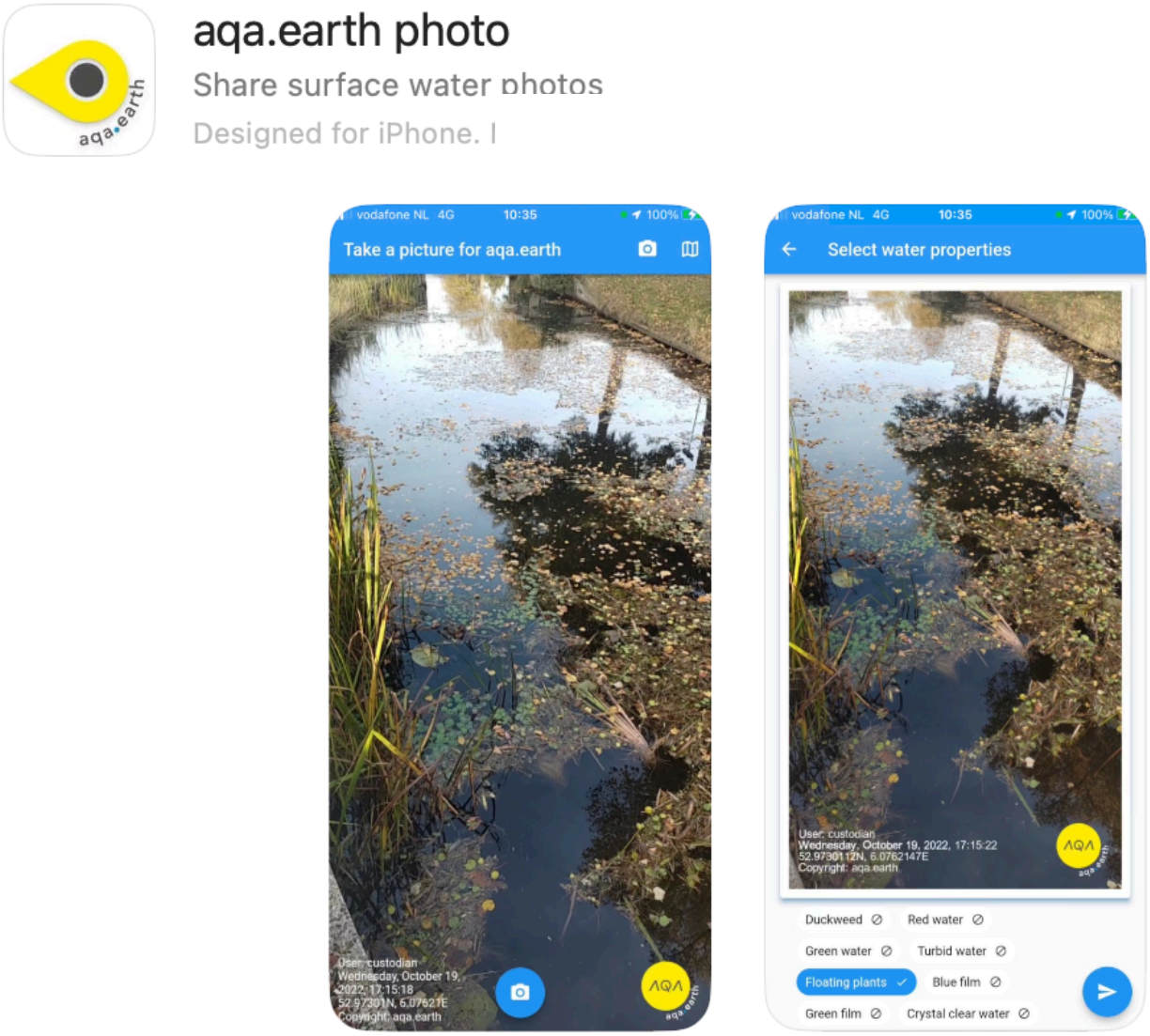


Figure 6, Aqa.earth photo app in App Store.


Algorand
pledges to be the greenest blockchain
with a carbon-negative network
now and in the future
aqa.earth chooses to build on
Algorand to fullfill its mission as
custodians of our living environment
now and in the future

7 aqa.micropayment

7.1 Algorand Blockchain

Aqa.earth uses the Algorand blockchain to organize:

- Data consistency through the storage of data hashes.
- Proof of sensor ownership.

One of the main drivers for the choice of Algorand is its high energy efficiency. Algorand is state of the art. The Algorand blockchain uses Pure Proof of Stake (PPoS) instead of PoW (Proof of Work), thereby providing a highly secure, high-speed, low-energy, and low-transaction-cost ecosystem.
Another motive in line with energy efficiency lies in conscious environmental initiatives on the Algorand blockchain like PlanetWatch. We believe aqa.earth is a perfect match.

Our choice for the Algorand blockchain implies that we'll use its current infrastructure:

- The Algorand wallet.
- The Tinyman, decentralized exchange (DEX).
- Pera Algorand wallet for mobile phones.

7.2 AQA token

The aqa.earth token is an ASA (Algorand Standard Assets) token on the Algorand blockchain.

The AQA tokens represent the economic value of the aqa.earth ecosystem. From the start, you can buy and sell AQA tokens on the Tinyman decentralized exchange. We'll include other exchanges at later development stages of the network. The tokens are used to reward sensor owners with micropayments. Optionally, customers can also buy data by the use of AQA tokens.

7.3 AQA Epochs

We chose a token distribution model based on the organic growth of the network by rewarding sensor owners with AQA tokens. This approach helps us maximize the distribution of rewards to sensor owners, early adopters, and actual investors in our network. From the initiative's start, the AQA token is available for trading

on Tinyman through an AQA - Algorand token pair. Aqa.earth will initiate the AQA - Algorand pool.

The total number of AQA tokens amounts to one billion (1000 million) AQA tokens. We'll mint these tokens at the start with freeze and clawback options disabled.
From this total amount of AQA tokens, 900 million tokens (90%) are reserved for mining by sensor owners, 50 million tokens (5%) for aqa.earth, and 50 million tokens (5%) for AQA staking rewards and rewarding sensor owners for cleaning their sensors.

Table 1 gives a schematic overview of the token AQA token distribution model.

Table 1. Schematic overview of the AQA token distribution model.

Total number of AQA tokens	1,000,000,000	*100%*	
Total number of minable tokens	900,000,000	*90%*	AQAM
Staking & sensor cleaning rewards	5,000,000	*5%*	AQAS
Treasury	5,000,000	*5%*	AQAT

7.4 token distribution

After minting the AQA tokens, we'll distribute them over the Algorand addresses. In Figure 7, we have visualised the distribution of the AQA over the different Algorand addresses, starting with AQAM, AQAS, and AQAT.

AQAM

The minable tokens are equally distributed over 900 Algorand addresses starting with "AQAM.....", where the M stands for mining. The addresses will be published to make the token distribution process transparent and trackable. The mining process is divided into 900 AQA Epochs so that each Epoch has its Algorand address from which we pay the mining fees. A new Epoch starts when all tokens in the mining address belonging to the latest Epoch are in circulation.

AQAS

The tokens for staking & sensor cleaning rewards are divided over 50 Algorand addresses starting with "AQAS.....", where S stands for staking and sensor cleaning rewards. The addresses will be published so that the tokenomics are transparent and trackable.

AQAT

The tokens for aqa.earth are divided over 50 Algorand addresses starting with "AQAT...." where T stands for the treasury. Also, we'll publish these addresses.

From the start of our initiative, the AQA token can be traded on the Tinyman DEX. This is realized by the aqa.earth team through an AQA / Algo token pair that is placed in a pool owned by the team. The AQA tokens put in the pool originate from the aqa.earth Treasury address AQATEPVYAV.....2EPTDQJN5U. Income generated through token sales will be used to develop the aqa.earth network.

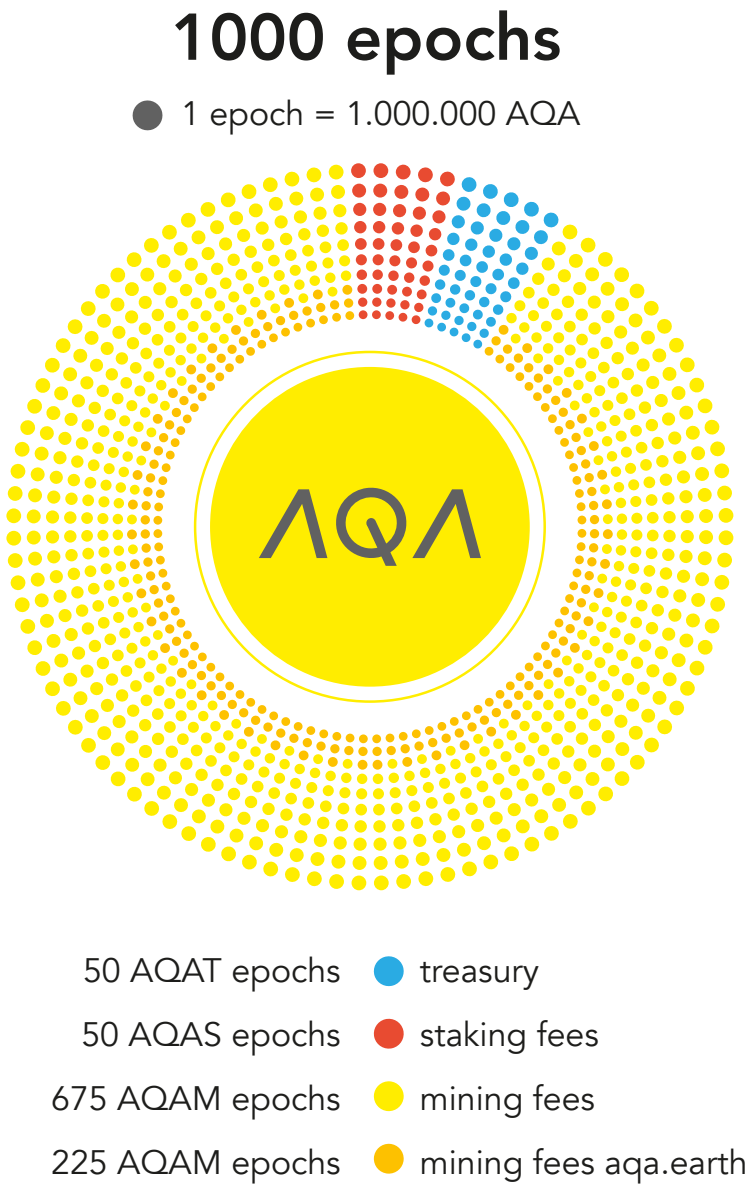


Figure 7, 1000 Epochs distributed over the different addresses

Update:
Thanks to publicly available external data, the photo app and our in-house developed mapping and data analysis software, we created network data value much faster than anticipated. This made us realize that we should change our approach in order to growh the aqa.earth network in the most cost efficient way.

With all our sensor prototypes successfully tested, we decided to already close batch 1 and reward our early investors for buying sensors at such and early stage.

7.5 AQA rewards

The aqa.earth network participants determine the economic and social value of the aqa.earth network.

Aqa.earth will initially reward sensor owners for building the network and, over time, for data delivery to the network. Owning an active sensor in the network is enough to be rewarded with the AQA token. The price of the AQA token on the public market determines the payback time of a sensor.

Custodians of our living environment who share their photos through the app, will have the option to receive AQA rewards. These rewards are still to be determined.

data sharing rewards

The previous section explained that 900 million tokens (90% of the total amount) are reserved for mining by sensor owners. We also presented the basic principle of Epochs. This section will describe tokenomics in more detail, including the relationship between the data-sharing rewards and the Epoch number.

As the network grows, the efforts of the Aqua.earth development team for maintenance, data interpretation and facilitating further growth will increase accordingly. To scale the total amount of tokens available to the development team with the size of the network, we chose a model in which 25% of the data sharing rewards go to aqa.earth.

Table 2 gives a schematic overview of the distribution of mined tokens to miners and aqa.earth.

Table 2. Distribution of mined tokens over miners and aqa.earth.

Total number of minable tokens	900,000,000	*100%*	AQAM
Miners	675,000,000	*75%*	AQAM
Aqa.earth	225,000,000	*25%*	AQAM

As previously explained, we divided the network growth into 900 Epochs, where each Epoch has its Algorand address starting with "AQAM.....", where the M stands for mining.

The sensor owners will be mainly rewarded with AQA tokens when the network is still in the initialization phase. As soon as the network has obtained value because of its history file of water quality data and its predictive value of water quality, aqa.earth will start selling data to stakeholders. As the network grows, rewards will gradually shift from data-sharing rewards to data sales rewards.

To reward early investors in aqa.earth and to manage the transition from data-sharing rewards to data sales rewards, we used the Epoch number as a parameter to gradually decrease the data-sharing rewards as the network grows.

The daily data sharing rewards per invested euro (DMR) will scale as follows with the maximum daily mining reward per invested euro (MDMR), the Epoch number E and the maximum Epoch number Emax:

$$DMR = MDMR * (Emax+1-E)/Emax \qquad (1)$$

Application of a reward system according to equation (1), avoids discontinuities in the token reward reduction mechanism, such as caused by the "token reward halving method". Using the equation is essential since such discontinuities in the token availability may result in AQA value fluctuations.
Our approach to define a maximum daily sensor reward per invested euro anticipates on the introduction of new sensors at different prices levels, based on progressive insight on what information the aqa.earth network needs. This helps us maximize the sensor investment efficiency and relevance of the sensor data.

The AQA tokens (token ID 781829486 on the Algo blockchain) are available on the Tinyman DEX through an AQA – Algo pool created with Algo and AQA tokens owned by Aqa.earth. For this purpose, tokens of an Aqa.earth team address starting with AQAT will be used, see also the previous section.

After delivering the first batch of sensors i.e., the mining of AQA tokens starts.

We decided to reward sensors that are powered with solar cells with extra data sharing rewards since we realize that data from remote areas will provide valueable extra information to the aqa.earth network. The extra rewards scale with the investment cost in the solar panel. In other words, if you apply a sensor with solar panel, your data sharing rewards per invested euro in a sensor plus solar panel will be precisely the same as compared to the situation which you apply a sensor and connect it to the public power grid.

Table 3. Maximum data sharing rewards for aqa.earth sensor owners.

sensor type	aqa.pinner	aqa.floater	aqa.solar
			
price sensor* invested euro	494 EURO	598 EURO	388 EURO
Max daily AQA rewards**	10	12,1	7,8

***** this is based on price on **https://aqa.earth/sensors/**, prices are subject to change.

** The data sharing rewards are currently in development and are subject to change. We are working towards a reward system that stimulates sensor ownership in focus areas.

staking and cleaning rewards
To reward early investors for participating in aqa.earth, we erected an AQA Founders Club (AFC). All sensor owners purchasing a sensor from the first batch will automatically become a member of te AFC and will be allowed to stake the tokens they mine for the first 2 years. Each year that AFC members mine tokens without moving them from their Algorand mining wallet, they will receive 2 months of extra rewards (1/6 of the annual rewards received in that year in their wallet). The staking rewards will be paid annually from the Algorand addresses starting with "AQAS....".

As the aqa.earth network grows we will obtain progressive insights that may result in additional types that we will put on the market. These sensors require some maintenance, such as cleaning them a few times per year. Cleaning the floaters a number of times per year may also appear to add value to the data. If this is the case, the aqa.earth team will be able to see this by automatically analyzing the sensor data.
In order to reward sensor owners for cleaning their sensors or doing some small maintenance, we also reserved tokens. Also these tokens will be paid from the Algorand addresses starting with "AQAS...".
It is noted that cleaning and small maintenance activities are sensor rewards making it possible to mine extra tokens. We will only introduce reward penalties for not cleaning a sensor or not doing sensor maintenance if the sensors in question stops uploading data to our servers.

data sales rewards
The growth of the network both in density and size will provide a shift from rewards for owning a sensor towards rewards for data delivery. During this shift, the sensor owners become data providers to stakeholders interested in the water quality data. Sensor owners will receive compensation for selling water quality data to the aqa.earth network.

We'll use the same infrastructure, wallets and AQA tokens to reward sensor owners for the data sale. In other words, we sell the data in euros and reward the sensor owners in AQA. Receiving the reward in AQAs will give sensor owners maximal convenience. All rewards are in the same wallet.

Figure 8 shows the course of the token distribution over time for a token reward system according to equation (1)

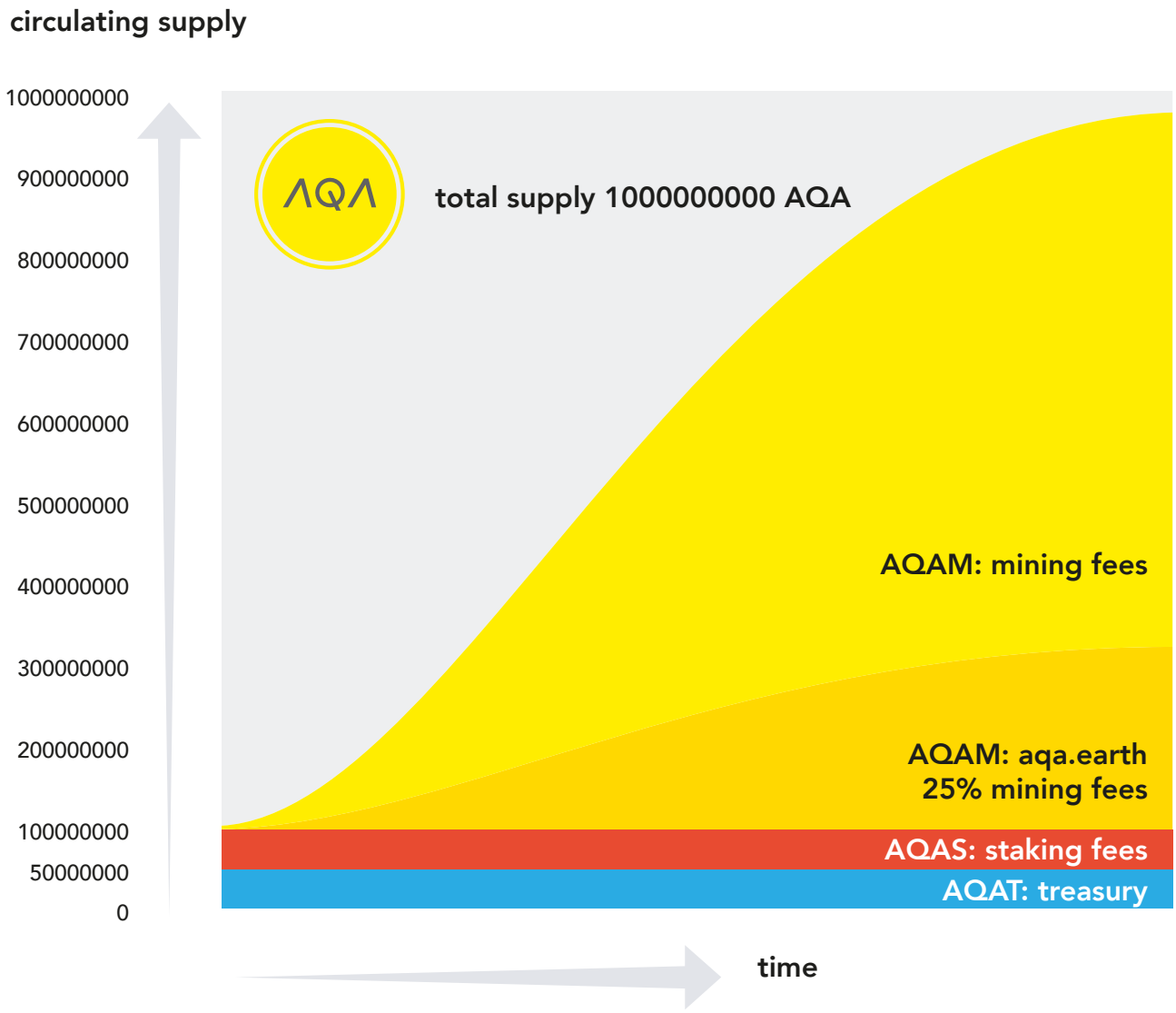


Figure 8, Circulating supply for a token reward distribution system according to equation (1) .

8. roadmap

This updated roadmap reflects aqa.earth's commitment:

- To develop the best possible sensors.
- Scale the sensor network.
- Collect and analyze data.
- Create predictive analytics models.
- Establish sustainable partnerships.
- Inspire stakeholders and the community.

Our roadmap has the following five main themes:

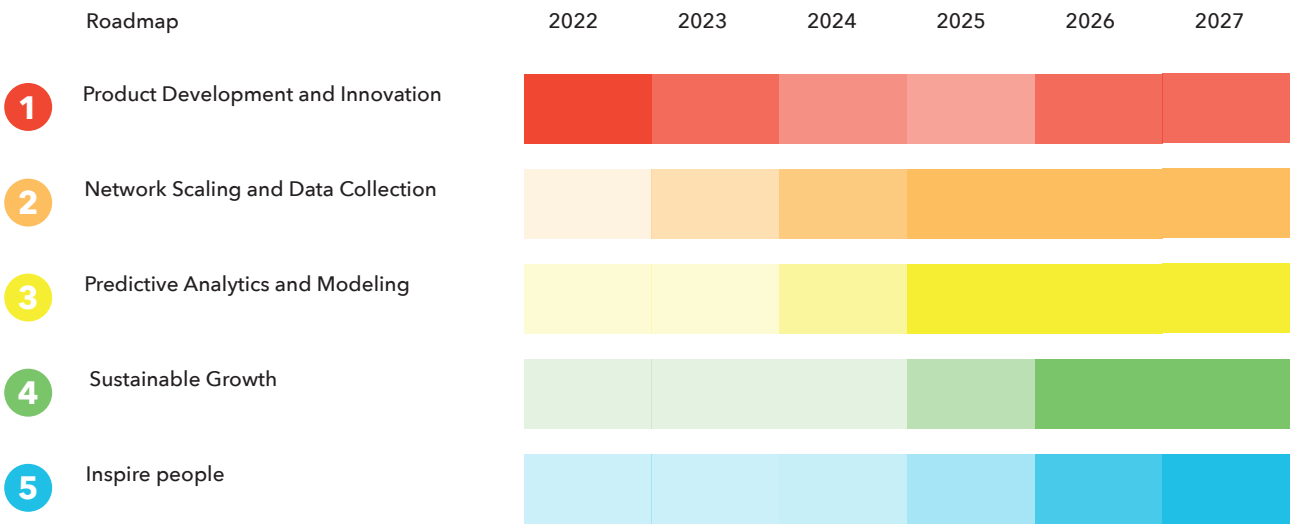


Figure 9, Roadmap with five themes.

In the following sections, the different themes will be discussed.

8.1 Product development and innovation

In the first theme, our main focus is on developing and innovating our products. We constantly work to enhance and broaden our offer, aiming to stay ahead in our market. It's important to us to be creative and ensure that our products are high quality. We prioritize designing products that take care of our users' needs. We manufacture our sensors in-house, enabling us to comply with EU regulations and adhere to industry standards. We utilize open-source software and our proprietary hardware in the production process.

In the following, we describe the different stages of our development process.

Prototype Development:

- Developing functional prototypes based on our latest insights, user feedback, and client demands.
- Validation of our sensors, ensuring they are accurate and meet specific customer requirements.

Integration:

- Miniaturization of the sensors without compromising performance.
- Enabling seamless integration into various monitoring systems.

Fabrication at Scale:

- Realizing manufacturing capabilities to produce the sensors at scale.
- Ensuring production efficiency to meet market demand.

8.2 Network scaling and data collection

Theme 2 highlights our mission to broaden our scope and collect crucial data. We expand our sensor network across various regions to improve water quality monitoring and data gathering. By grouping sensors in nearby areas and presenting clear data visualizations, we enhance our comprehension of the environment and ensure that stakeholders have the information they need to make well-informed decisions.

Below, we explain the different stages of network scaling in keywords.

Sensor Network Scaling:

- Expanding sensor network deployment to cover a wider geographic area.
- Enabling comprehensive water quality monitoring and data collection.

Sensor Network Expansion:

- We are realizing clusters of sensors in adjacent locations.
- We are gathering more comprehensive and localized water quality data for better analysis.

Data Visualization and Stakeholder Reporting:

- We are presenting analyzed data in a user-friendly manner to stakeholders.
- We are providing valuable insights and actionable information through reports and visualizations.

8.3 Predictive analytics and modeling

Data is vital for us. In Theme 3, we work on improving our data setup. We use data to understand the relationship between soil and water quality, build physics models, and help others make wise choices. Collaborating closely with Wetsus (European Centre of Excellence for Sustainable Water Technology), we develop physics-based models, integrate data, and provide premium analytics services, ensuring our platform remains a trusted source of knowledge and intelligence.

The following describes our approach to predictive analytics and modeling as an itemized list.

Physics-Based Models:

- We are developing physics-based models to understand relationships between soil and water quality parameters.
- We predict soil and water quality.

Sensor data fusion:

- Integrating information from multiple sensors to provide a more comprehensive understanding of a situation, including predicting water and soil quality parameters.
- Merging diverse data sources offers a more precise picture and enables indirect predictions that might not be directly measurable by a single sensor.

Stakeholder Communication:

- We communicate predictions and insights to stakeholders, including environmental agencies and policymakers.
- We are supporting data-driven decision-making and proactive measures.

Premium Analytics Services:

- Developing and offering premium data analytics services.
- Providing advanced data analysis, customized reports, and actionable recommendations.

8.4 Sustainable growth

Theme 4 is the cornerstone of our financial stability and sustainable growth. We diversify revenue streams, embracing responsible business practices. Our strategies include comprehensive marketing, strategic partnerships, customer success initiatives, and data monetization. We ensure a long-lasting impact on water management and sustainability through alliances with industry stakeholders, government agencies, and institutions.

In the following, our key focus areas for sustainable growth are described.

Partnerships and Collaborations:

- Forming strategic alliances with environmental organizations, research institutions, and government agencies.
- Providing specialized services such as research projects, consulting, and customized solutions.

Data Licensing and Monetization:

- We are exploring opportunities to license water quality data to third-party organizations.
- We are generating additional revenue streams through data monetization.

Investment and Funding:

- Seeking investment opportunities and securing funding to support expansion and innovation.
- Ensuring sustainable growth and impact.

8.5 Inspiring people

We are committed to our community. In Theme 5, we create communication strategies to emphasize the importance of water quality and environmental care to our customers, schools, and the general public.
Our plan showcases our firm commitment to innovative solutions, reaching more people, using science and data best, prioritizing sustainability, and engaging the community. We invite everybody to join us on this journey toward a future focused on clean water and environmental care. Together, we can achieve our goals with dedication and optimism.

The following explains our focus areas through an itemized list of activities.

Targeted Messaging:

- Developing tailored communication strategies to engage and inform stakeholders.
- Reaching government agencies, environmental organizations, businesses, and the general public effectively.

Education and Awareness Programs:

- Conducting educational initiatives and awareness campaigns.
- Promoting the importance of water quality monitoring, environmental stewardship, and sustainable practices.

Thought Leadership and Industry Events:

- Participate in industry events, conferences, and thought leadership activities.
- Share expertise, establish credibility, and build relationships with key stakeholders.

Aqa.earth aims to provide valuable water quality insights, contribute to environmental sustainability, and become a trusted leader in the water monitoring industry by following this roadmap.

9. aqa.earth team

Figure 10, Founders of aqa.earth at our home ground at Oudehorne.

The founders of aqa.earth: Frank Akkerman, Mateo Mayer, Michiel Oudakker and Martijn Wagterveld.

Together, we form the core team with 10+ years of experience in each of the following fields:

- Shared interest in community-driven fact-finding to improve our living environment.
- Shared enthusiasm and an unstoppable drive to create things.
- Strategy development and consultancy.
- Design and production of water sensors and water purification equipment.
- CE certification and governmental approval of equipment.
- Setting up and managing the in-house production of sensors.

- Data analysis and sensor data fusion.
- Cryptocurrency analysis, mining and software development.
- Innovation management and strategy analysis in the chemical process industry.
- Contract research and IP portfolio management.
- Poultry farming.
- Managing scientific projects at Wetsus, European centre of excellence for sustainable water technology.
- RF circuit design as Full Radio amateur license holder (Agentschap Telecom, The Netherlands).
- 5 academic degrees in the fields of chemical engineering, industrial design engineering, electrotechnical engineering, industrial crystallization, dynamic modeling of complex industrial polymerizations..

We actively work together with and participate in the WaterCampus Leeuwarden, the Water Alliance and Wetsus, European centre of excellence for sustainable water technology. Through Wetsus, we actively participate in sensor and sensor data fusion projects with Wageningen University & Research, Delft University of Technology and Eindhoven University of Technology.
In order to be anti-fragile towards present and future scarcity of labor and electronic parts available on the market, we develop, certify and produce all our software and hardware in- house.
In order to be anti-fragile towards present and future crypto market fluctuations we will initiate and invest in sensor data selling projects to stakeholders from the very beginning. Examples of stakeholders are municipalities, waterboards and commercial parties in the water recreation sector. Our starting point is the roll-out of the Aqa.earth network with our proven in-house developed technologies and we'll scale up our activities as the network grows.

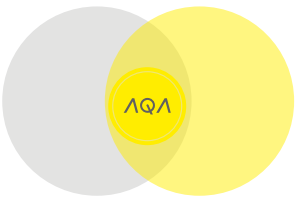
10. business principles, privacy & legal notice

Aqa.earth is an initiative of EasyMeasure Developments B.V., founded in 2009 and registered at the Dutch Chamber of Commerce at Amersfoort, ID # 32155639.
Aqa.earth is a community supported initiative. In order to protect the aqa.earth network, its founders have defined a number of business principles and rules that EasyMeasure Developments will act on, now and in the future.

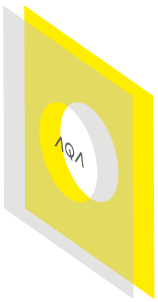
10.1 business principles

Our business principles are:

first principal thinking
We aim to understand the nature of things based on physics, chemical, and biological principles. Reasoning from first principles enables us to make original solutions in a complex context.



academic pragmatism
Understanding how to create and build an ecosystem of sensors and advanced sensor fusion algorithms requires specific knowledge. But that is half the story; where these domains of deep knowledge overlap is where common sense shines. We call this academic pragmatism, combining deep knowledge with common sense.



transparency
The ecosystem shines when different people with different backgrounds and needs contribute. Transparency in managing the ecosystem is essential for everyone involved to stay committed and trust our direction.

informal culture
Seeing the bigger picture is often about seeing people. We have an informal culture. No roles and job descriptions. We believe in goals and excellent work.

10.2 privacy & legal notice

Our white paper is our guide for making decisions for the aqa.earth network. In case of unforeseen circumstances, we will take action on behalf of the network to the best of our knowledge and communicate our actions within a reasonable time through the aqa.earth website.

Privacy notice

1. When you visit the aqa.earth website, we may collect following data:
- Your IP address.
- Your contact information and e-mail address if you provide it to us..
- Data profile regarding your online behavior on our website.

We collect these data to:
- Better understand your needs.
- To improve our services and products.
- To customize our website according to your online behavior and personal preferences.

2. We are committed to securing your data and keeping it confidential and do everything in our power to prevent data theft, unauthorized access and

disclosure by implementing the latest technologies and software, which helps us to safeguard all the information we collect online.

3. Once you agree to allow our website to use cookies, you also agree to use the data it collects regarding your online behavior (analyze web traffic, web pages you spent most time on, and websites you visit). The data we collect by using cookies is used to customize our website to your needs. After we use the data for statistical analysis, the data is completely removed from our systems. If you want to disable cookies, you can do it by accessing the settings of your internet browser.

4. We will treat all personal information of sensor users and participants in the aqa.earth network confidentially and use it only for e-mail communication on sensor or license orders, sensor maintenance and for the shipping of ordered sensors to the address provided to us. We act in line with the EU directive 95/46/EC on the protection of individuals with regard to the processing of personal data. Further, we only use servers that are physically located in the EU.

5. Aqa.earth sensors that are equipped with a GPS produce sensor data containing the GPS coordinates of each sensor and a timestamp of the data. We will use the GPS coordinates to assess the quality of the local living environment in which the sensors are installed. Also, we will store the GPS data along with the sensor data in our databases for future analysis. These databases may become public when data are sold to stakeholders. To protect sensors installed in remote areas, we may decrease the resolution of the GPS data before sensor data are sold. We will never link your personal data to stored GPS data or other stored sensor data. The legal basis for storing the GPS data of sensors is the justified interest to monitor water quality in the living environment where the sensors are installed.

6. At some point, you might wish to restrict the use and collection of your personal data. You can achieve this by sending and an e-mail to info@aqa.earth with the request to remove your personal data from our databases. Please note that in case you own an aqa.earth sensors, removing your personal data from our databases will make it impossible for us to support you in case of any questions.

Legal notice

1. The information on our website and in the aqa.earth whitepaper are for information purposes only. It reflects our current insights in how to efficiently build a community driven ecosystem to shine a light on surface water quality. Although we'll do our very best, aqa.earth cannot guarantee that the network will be developed exactly according to the information on this website or the white paper. Future developments and insights might force us to undertake actions that are not described on the aqa.earth site and in the white paper or even deviate from it.

2. Aqa.earth cannot guarantee the accuracy of any data or conclusions drawn from the website or the whitepaper. The use of any information in them is at your own risk.The aqa.earth website and the whitepaper are not an offer to buy AQA tokens. All persons and parties purchasing AQA tokens do this at their own risk. Aqa.earth cannot be held liable for any direct or indirect damage resulting from inaccuracy of information on the aqa.earth site or the whitepaper.

3. At the start of the network, aqa.earth will make AQA tokens (token ID 781829486 on the Algo blockchain) available on the Tinyman DEX through an AQA – Algo pool created with Algo and AQA tokens owned by aqa.earth. For this purpose, tokens of an aqa.earth team address starting with AQAT will be used, see also the whitepaper.

4. There are 1 billion (1000 million) AQA tokens. The tokens are distributed over AQAM, AQAS and AQAT addresses according to the procedure in the whitepaper. The addresses are public on the Algo blockchain since 18 June 2022 through transactions from the AQAearth mint address: EARTHAICLIKK2IX7LILQNAI47O7LUL67SXALB3XSQNADHPZYC64U4YEYRY

5. The AQA.earth token does not provide voting rights or a share in EasyMeasure Developments B.V., owner of the aqa.earth tradename.


Photo made with the aqa.earth app
Wednesday, July 20, 2022 12:46:15
52.413012N 4.862351E
© aqa.earth


Sunday, July 24, 2022 16:57:16
53.196081N 5.803010E
© aqa.earth

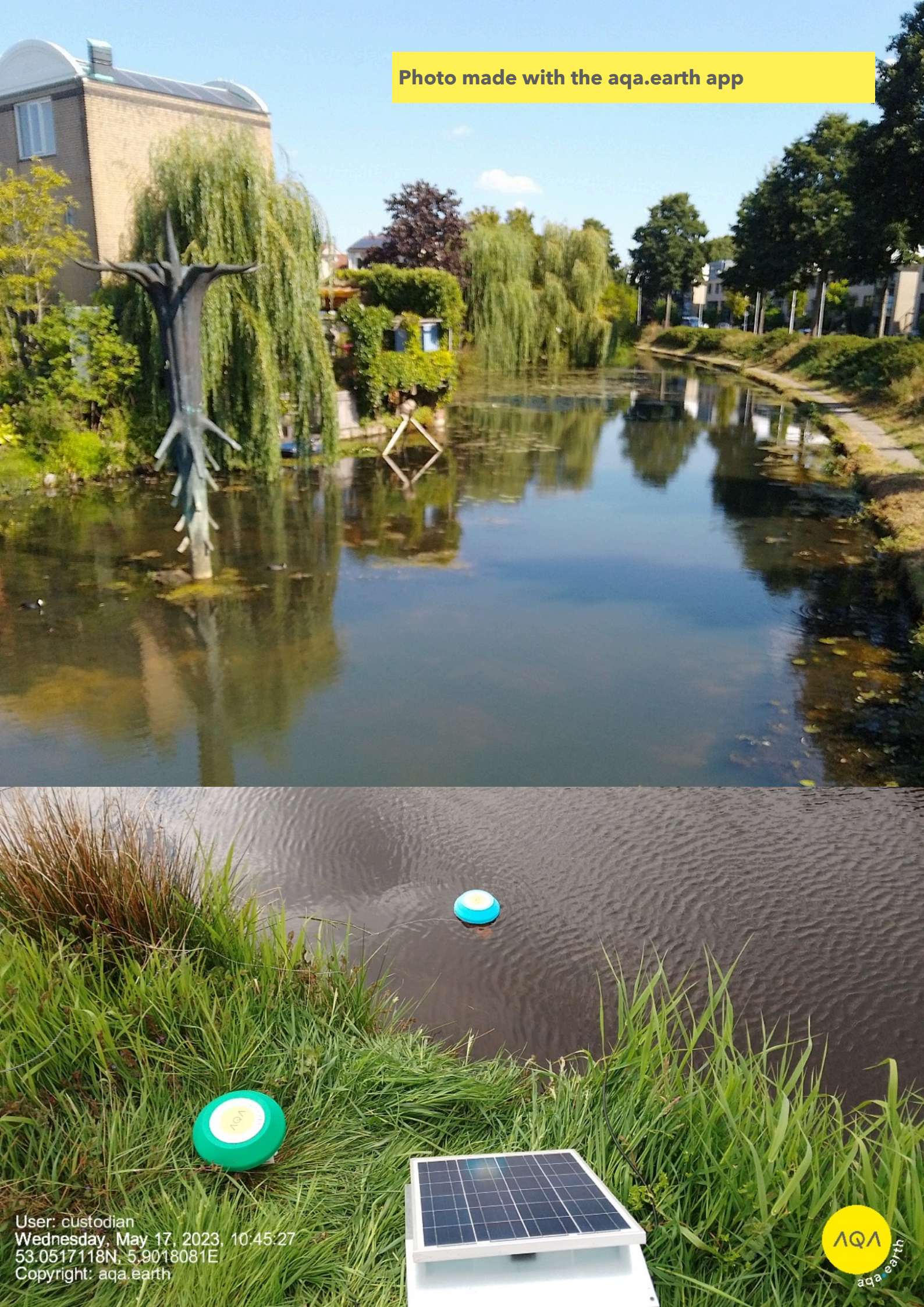


Photo made with the aqa.earth app
User: custodian
Wednesday, May 17, 2023, 10:45:27
53.0517118N, 5.9018081E
Copyright: aqa.earth
AQA
aqa.earth


Photo made with the aqa.earth app
This photo shows a duckweed problem caused by the high concentration of nutrients in the water
AQA
Saturday, September 3, 2022 13:38
52.195237N 5.42540
© aqa.ea








aqua-varia


Let’s shine
a light on
water
aqa.earth

Let's shine a light on water

Aqa.earth's mission is to collectively shine a light on water quality in our immediate living environment. Knowing the quality of the water helps us safeguard our collective health, ecology and well-being

aqa.data

Aqa.earth is giving value to local stakeholders by providing them with a dashboard. The dashboard gives local water-related insights based on the data of sensors in the area and several algorithms.

aqa.sensor

Shining a light on water quality refers to our robust sensor technology for measuring the surface water quality using different wavelengths (colors) of light.

AQA.micropayment

The aqa.earth network uses blockchain technologies to facilitate the

Algorand