Kemira

Water management 2040

Future scenarios

Content

Foreword

About this report

We need water to survive. But there are significant challenges to our world's water supply. How can we rise to the occasion and make sure that no one goes without? To understand what the future of water management might hold, we invited an influential panel of experts to discuss different challenges, opportunities and possible paths ahead. This report is the outcome of those discussions, painting four very different scenarios for the year 2040. What will actually happen? No one knows. But it's important to consider the possibilities.

As part of the Sustainable Development Goals, the United Nations has introduced a very ambitious common goal for humanity: clean water and sanitation for everyone by 2030. That means safe water for about 8 billion people in less than 10 years. Today, in 2021, one in three people don't have safe drinking water. More than 80% of the wastewater produced globally is discharged back into rivers and seas without any treatment. We have come a long way, but we still have a long way to go.

The timespan of the scenarios in this report is a bit longer, looking into 2040. International institutions, governments, local authorities, water utilities and water-intensive industries all have important roles to play in ensuring a safe, sufficient water supply. So do water treatment solutions providers like Kemira. The decisions we make today about water access, quality, technologies for water treatment and water reuse impact the future living conditions of communities around the world. They also impact the natural systems to which we owe our existence. Public awareness is an important piece in this puzzle. As a society, we are learning to value water as a finite natural resource to be safeguarded.

We are not able to predict the future. As such, the scenarios presented in this report are not forecasts, and no single scenario is more likely to come true than another. Rather, they are a way of exploring the possible outcomes of developments that are already recognizable today.

The “what if?” stories presented here can give food for thought for strategic discussions, inspire cooperation, technology development, and encourage new and innovative ways of thinking.

The future of the water cycle two decades down the line remains unwritten. It will be a story that we as humanity create together. Let’s work hard for a sustainable water cycle that is able to support people, industry and the planet for generations to come.

First and foremost, we hope that these scenarios act as discussion starters and thought provokers. Please share your perspective with us, feel free to comment and reach out.

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Scenarios: executive summary

These four future scenarios for water management 2040 are imaginable outcomes of developments that are already recognizable today.

Scenario 1

“Water conflicts and resource games”

Economic growth, nationalism and protectionism define the global order. People prioritize individualism over the common good.

Policymakers focus on present crises rather than looking to the future. Climate action is not advancing. Continued population growth has led to resource scarcity.

Climate change and extreme weather are reshaping population centers. Ecosystems and biodiversity are damaged.

Nearly all regions suffer from water scarcity. Megacities in Central America, Northern India and the Middle East are under extreme water stress.

Industry, agriculture and consumers clash in the competition for water.

Governments and citizens support investments in water infrastructure. But investments lag and the quality of infrastructure varies significantly.

Scenario 2

“Cities and corporations lead on water”

Public confidence in central governments has faded. Cities and corporations fill the leadership void.

Backed by the private sector, city-led regulations and financing drive decarbonization and the shift to the circular economy. Sustainable development slows climate change.

Renewable energy and hydrogen technologies rapidly advance. Electricity prices drop in industrialized economies.

Circularity, biotechnology and new sustainable supply chains lead to more closed-loop agriculture and vertical farming.

Privatized water management and decentralized systems become more common, leading to an even stronger focus on efficiency.

Water reuse and resource recovery are economically attractive and mainstream. Fit-for-purpose water increases. Water availability and security improves in many regions.

Scenarios: executive summary

Scenario 3

“Data- and platform-driven water”

Global economic development is driven by moderately regulated markets and digitalization (e.g. open platforms, improved internet access, free data).

Open source e-commerce platforms stimulate free markets in emerging economies.

New generations demand change. Open data holds institutions accountable, reducing corruption.

As living standards increase, overconsumption worsens climate change and biodiversity.

Global energy prices drop thanks to investment in maturing renewable energy technologies like solar, wave and wind.

Economic growth in emerging economies prompts investments in water infrastructure, improving global water availability and affordability.

New food production technologies, such as lab-grown meat and aquaculture, meet global demand for protein.

Local water companies and capital-intensive water infrastructure become attractive to institutional investors.

Scenario 4

“Circularity and regulated water”

International institutions like the UN and EU play strong roles in redefining value. Economic growth is no longer the main measure of success.

Increased environmental regulation protects water sources, prevents overconsumption, and addresses micropollutants and microplastics.

Water reuse is required in many countries. Wastewater and sewage sludge become key sources of energy, nutrients and biobased feedstocks.

Agriculture remains challenging. The sector is slow to embrace innovation. Farmers struggle with water-related issues that jeopardize their ability to meet global demand for food.

Public-private partnerships and innovation improve water availability in emerging regions.

Centralized water utilities are the preferred option for cost-effective water treatment including micropollutant removal. Utilities upgrade old systems by digitalizing water treatment.

Scenario comparison table

	Water conflicts and resource games	Cities and corporations lead on water	Data- and platform-driven water	Circularity and regulated water
DRIVERS	• The world is driven by economic growth and protectionism • Strong global population growth • Failure to coordinate on sustainability and climate action	• Strong pressure from citizens to solve climate change • Circular economy driven by cooperation between corporations and large cities • Strong renewable energy development	• Market-driven and moderately regulated economy • Information-driven society • Political stabilization in emerging economies accelerates growth	• Multilateral agreements drive sustainable development (e.g. UN, EU) • Strong climate activism • Industrial countries commit to climate action
ENVIRONMENT	• Reactionary climate action instead of preventive • Climate change seriously but unequally effects different regions	• Robust climate action and shift to the circular economy • Many countries achieve emissions targets	• Global living standards increase • Overconsumption becomes a key environmental challenge	• Common zero emission targets are enforced • Warmer cycles in the Earth's climate show some signals of slowing. • Sustainable agriculture remains a challenge near the Equator
REGULATION	• Zero emissions targets are constantly postponed • No unilateral and international agreements	• Corporations and cities cooperate on new economic models • Great emphasis on legislation for the circular economy	• Moderate regulation • Limited regulation on data usage	• Environmental regulation increases worldwide • New regulations mandate removal of micropollutants and microplastics
CONSUMERS	• Most consumers fail to consider climate and sustainability in purchase decisions	• Consumers are climate conscious • Consumers play a larger role in water treatment and recycling	• Connection through global platforms • Increasing demand for better quality solutions in emerging and transition economies	• Consumers are active influencers • Citizens in industrial countries are more conscious about their water footprint and water sources

Scenario comparison table

	Water conflicts and resource games	Cities and corporations lead on water	Data- and platform-driven water	Circularity and regulated water
WATER AVAILABILTY	• Increasing water scarcity creates conflicts of interest among different water users • Serious challenges in water-stressed megacities	• Water availability and security improves • The private sector offers fresh solutions and financing to support water efficiency	• Water is more widely available, affordable and higher quality • Many emerging economies have implemented modern wastewater treatment • Large private banks invest in infrastructure in emerging and transition economies	• Strong institutional investing in water infrastructure • Water reuse is required in many countries
AGRICULTURE	• Agriculture fails to decrease water consumption • Demand for food production increases	• Agrotechnology advances • Closed-loop agriculture and vertical farming reduce water consumption	• Water efficient precision agriculture and new food production technologies are widely accepted	• New technology and approaches to water distribution support efficient water use in emerging countries • Agricultural water usage does not decrease
WATER AFFORDABILITY	• Price of water is high; different prices for drinking, irrigated and industrial water • Some water sources become private assets • Water trading among areas and interest groups	• More water recycling and reuse increases water prices • Stakeholders accept higher prices for improved sustainability	• Affordability and quality of drinking water improves, especially in emerging and transition economies • The cost of water treatment drops thanks to renewable energy	• Social programs cover the cost of water for low-income communities • Public-private partnerships and innovation improve water availability in emerging regions
WATER UTILITIES	• Aging infrastructure is renovated and expanded in population centers • New investment in water recycling and wastewater treatment plants • Decentralized systems become more common	• Digitalization and reinvestment improve efficiency of aging water infrastructure • Decentralized systems are more common; water reuse is mainstream • New solutions and financing reduce waste, improve resource use, and water efficiency	• Centralized systems are common in large cities • Hybrid models and water reuse are prevalent in rapidly growing cities in emerging economies • Large water appliance manufacturers supply decentralized water management systems and water capture systems for rural areas	• Decisions about water management include public participation • Centralized water treatment utilities in the Western world receive major investments from institutions • Municipal water utilities are online and digitally-enabled, including data-driven quality control

Scenario 1

Water conflicts and resource games

Scenario 1: Water conflicts and resource games

Economic model and climate change actions

The world is driven by economic growth. Nationalism and protectionist interests prevail. Nations are most concerned with securing their own prosperity. Population growth continues, particularly in emerging economies. Too little attention is paid to sustainable development, leading to global resource scarcity. Overconsumption and insufficient waste management puts a significant strain on natural ecosystems.

Extreme weather conditions are more common around the world, reshaping population centers and changing natural landscapes. People from the driest and hottest regions are constantly migrating in search of better living conditions. There is more stress on the natural environment, especially water systems (i.e. rivers, freshwater reservoirs). Around the world, all regions are faced with serious climate-related issues, but the impact is unequal. There are drastic differences in environmental conditions. The first signs of water conflicts and bioterrorism emerge.

Policymakers focus on managing current crises rather than on preventive actions and climate change mitigation. People do not view multilateral agreements as a means for tackling global issues. Zero emissions targets are constantly postponed, and people continue to rely on fossil fuels. Emissions trading and compensation schemes are the go-to tools for mitigating negative environmental impacts. The circular economy has not advanced to its full potential.

Consumer behaviour and technologial disruptions

Consumer behavior is mostly driven by individualism rather than the common good. As a result, sustainable consumption and the sharing economy doesn't further develop. Purchase decisions are made on price, ownership and other factors.

There is increasing water scarcity, so the perceived value of water rises. People and companies pay to secure their own high-quality water supply. Personal water purification systems and rainwater capture become more common across all markets.

> Industry, energy producers, agriculture and consumers disagree over ownership of water.

Scenario 1: Water conflicts and resource games

Water availability and affordability

All regions are subject to water scarcity. People in megacities in Central America, Northern India and the Middle East suffer from water stress the most. The water supply decreases, made worse by dragging investments in infrastructure. Human migration increases as people flee areas like the Horn of Africa. Some regions are no longer inhabitable due to climate change and continued droughts.

Energy producers (e.g. hydropower), agriculture and consumers disagree over ownership of water. Conflicting interests cause private enterprises to secure access to water through backward integration. Water becomes a corporate asset. Private ownership of water sources such as rivers and freshwater reservoirs gain political acceptance in many regions. Because of scarcity, water trading is more common among locations. There are different prices for drinking water and for irrigated and industrial water. Other sources of water, such as rainwater capture and recycling, become acceptable substitutes for raw water sources.

Water utilities and infrastructure

Because of scarcity, investments in water reuse gain increasing support from both governments and citizens. Large population centers that no longer have access to raw water sources secure supply thanks to capacity expansion and renovation of aging infrastructure, as well as new investments in water recycling and wastewater treatment plants. Partial financing comes from private companies in exchange for a share of revenue and future rights for resources recovered through the water treatment process. Global superpowers like China and the US invest in water infrastructure of emerging economies.

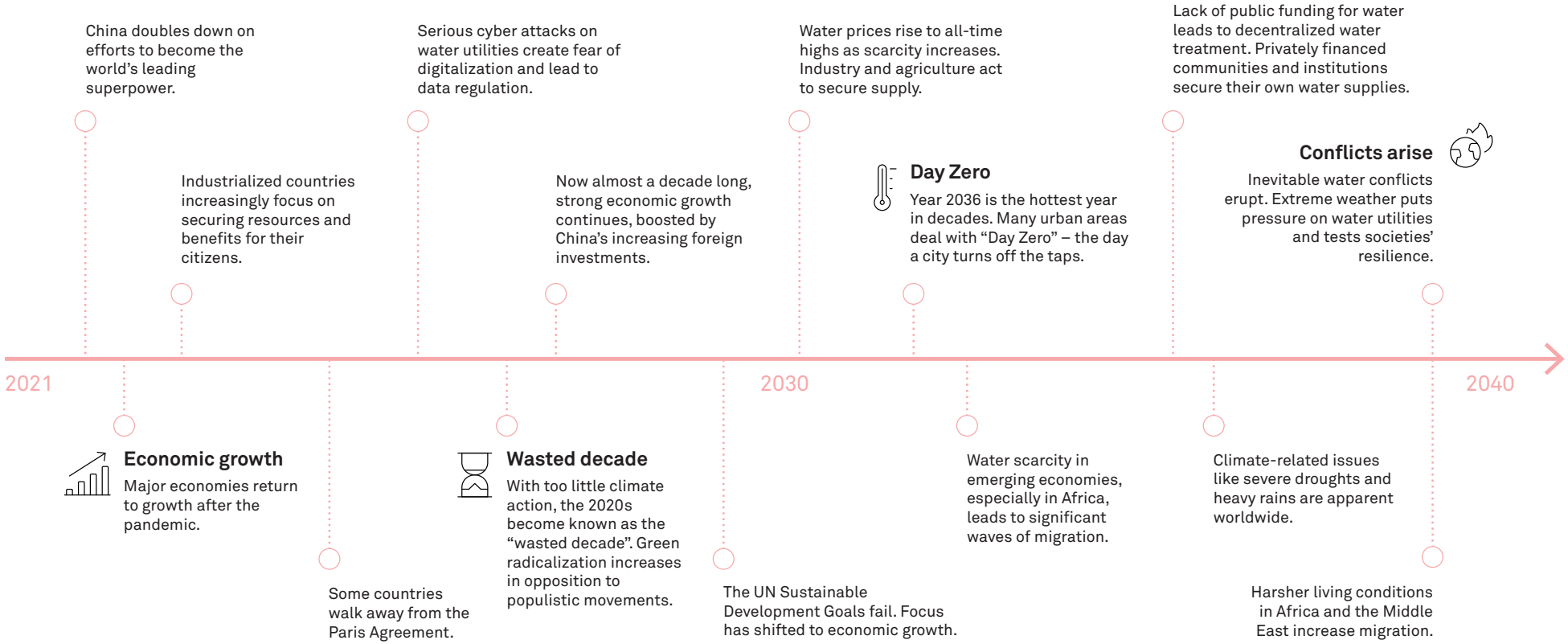
Lack of public funding for water treatment and infrastructure encourages a shift to decentralized systems that are managed by private water and construction companies. Neighborhoods, houses and apartment buildings that can afford decentralized systems are better off. The quality and level of infrastructure between living areas becomes noticeable.

Protecting infrastructure from extreme weather conditions requires significant investment.

SCENARIO TIMELINE

Water conflicts and resource games

Indicative projections on how events might unfold



Scenario 2

Cities and corporations lead on water

Scenario 2: Cities and corporations lead on water

Economic model and climate change actions

Citizens in industrialized countries have lost faith in the traditional political system. As central governments decline, decentralized governing grows. Local hubs prosper. Megacities and large corporations set ambitious sustainability targets and collaborate on decarbonization. With support from corporations, cities nurture the shift to the circular economy through policy and financing. Government subsidies create incentives for companies to move from linear to circular business models, achieving economies of scale. Products with circular design become globally competitive.

At the same time, this close collaboration means corporations tighten their hold on cities and regional economies. Manufacturing, water and energy corporations that were first movers in the new circular economy become conglomerates. They expand by acquiring supporting business areas. With outsized roles in the new economic model, these conglomerates strongly influence regional politics. They have increasing leverage on the local water supply, infrastructure investments and economics.

As a result of successful decarbonization and commercial development of the circular economy, the world meets emissions targets. Population growth decelerates due to increasing wealth and green values in emerging economies. Global warming is expected to slow down.

Consumer behaviour and technologial disruptions

Renewable energy and energy storage technologies improve and expand significantly because of increased investment and financial subsidies. The hydrogen economy scales up, reducing dependence on fossil fuels. Better renewable energy sources and storage bring down the price of electricity in industrialized economies, making energy-intensive water management technologies economically viable.

New requirements related to circularity and sustainable supply chains prompt a shift in agriculture. With advances in biotechnology and sensor technology, urban areas increasingly turn to closed-loop agriculture and vertical farming, which use water more efficiently.

Consumers are conscious of climate and sustainability. They play larger roles in water management and recycling. Recycling water and resources become more attractive and economically feasible options.

Scenario 2: Cities and corporations lead on water

Water availability and affordability

With the new circular economy and more widespread water reuse, water availability and security improve. Water recycling and advanced monitoring cause the price of water to increase in many countries. Stakeholders accept higher prices because they value climate and circularity over cost considerations. Water management becomes more efficient as privatization increases.

The private sector pursues ownership of water and energy infrastructure.

Water utilities and infrastructure

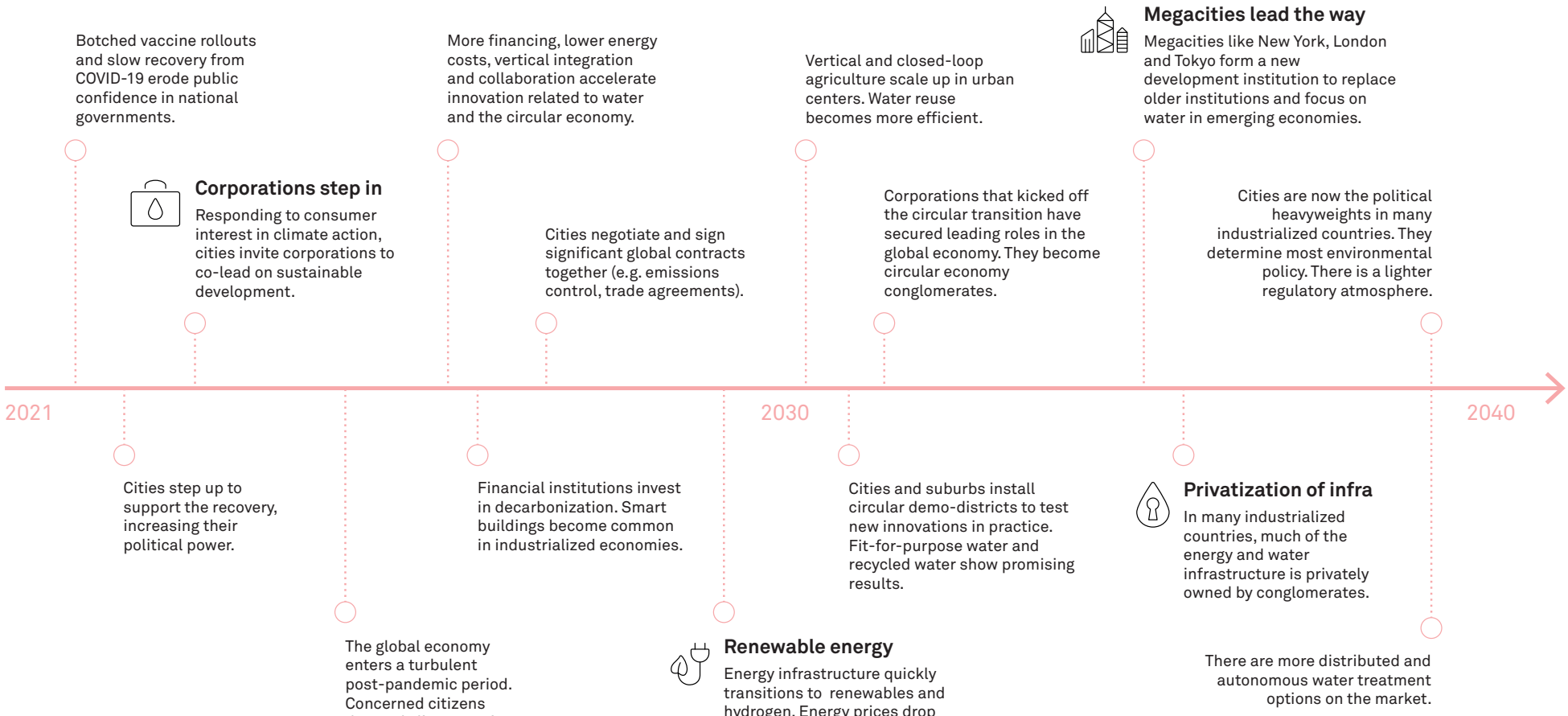
Public water management is upended by major changes to the global economic model. The private sector pursues ownership of water and energy infrastructure, and implements new solutions and financing for minimizing waste, recapturing resources and increasing efficiency. Privatization also improves the efficiency of older water infrastructure through digitalization and reinvestment. Fit-for purpose water becomes mainstream.

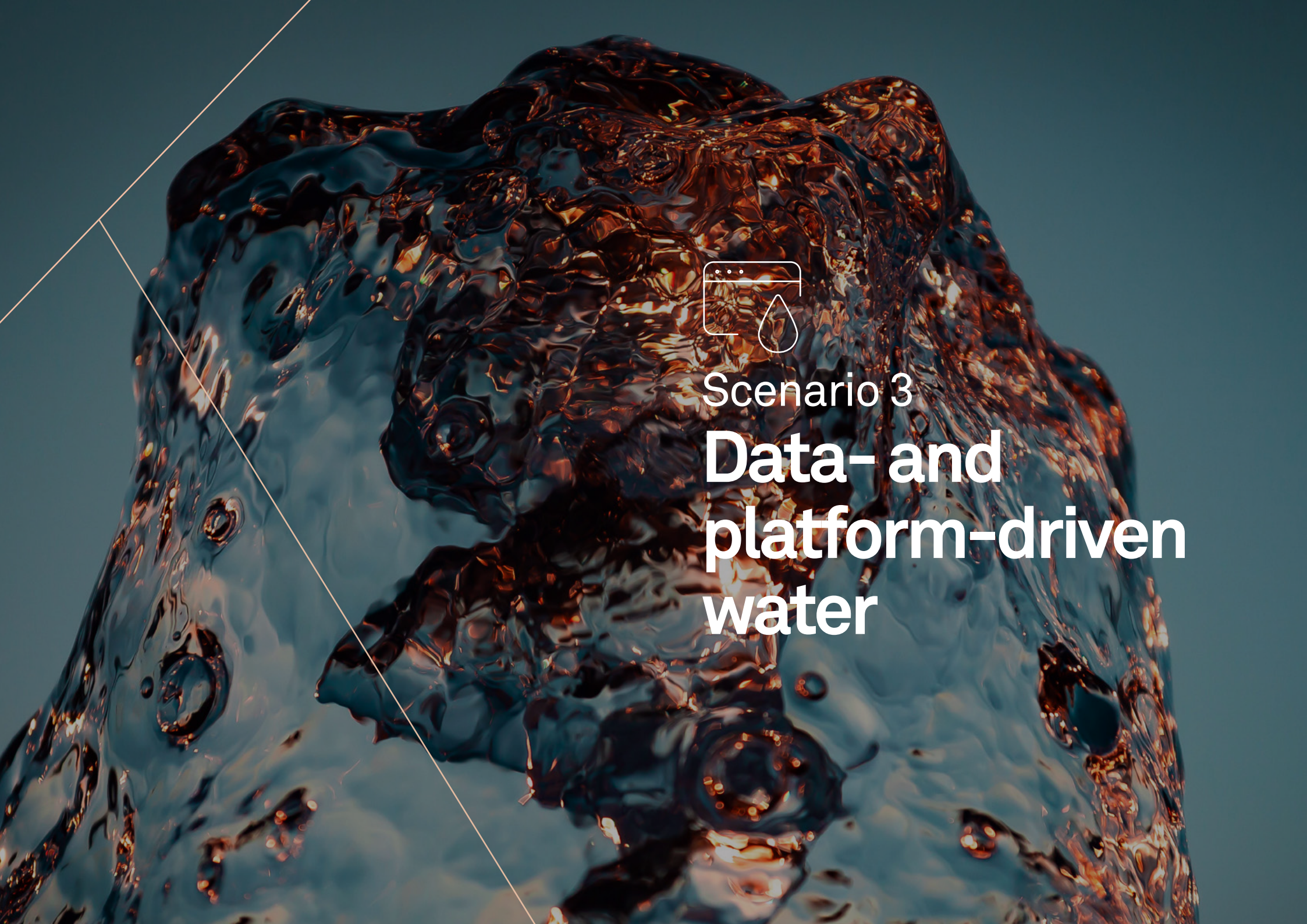
Consumers are increasingly aware of water-related issues. They opt for local, closed-loop water treatment systems. They must choose a private provider carefully; contracts are usually bundled with energy and waste. Corporate giants tightly control urban water infrastructure in major cities through technology, data and service deals.

SCENARIO TIMELINE

Cities and corporations lead on water

Indicative projections on how events might unfold





Scenario 3

Data- and platform-driven water

Scenario 3: Data- and platform-driven water

Economic model and climate change actions

Digitalization drives global development. Opensource software, online platforms, internet access and free data are widely available. The value of data increases, challenging the traditional global order. Political systems are overshadowed by online platforms, where citizens directly engage in decision-making. Digitalization stimulates free markets and new growth, especially in emerging economies. In transition economies, local companies easily connect to global markets, accelerating growth. In the least developed economies, growth is slower but macroeconomic conditions and political stability improve. New generations demand reduced corruption. Open data holds politicians and institutions accountable. Digitalization also improves education and gender equality.

As living standards increase worldwide, overconsumption becomes a key challenge for the environment. Climate change accelerates and biodiversity suffers despite advances in renewable energy and manufacturing.

Consumer behaviour and technologial disruptions

The renewable energy revolution matures quickly. Energy prices drop worldwide thanks to better technology solar, wave and wind power, as well as increased investment in renewables. Together, these superior technologies and reduced electricity prices allow energy-intensive water solutions, such as desalination, to further develop and gain market share.

Access to water improves in many regions, and more countries pay attention to water quality. The average global consumption of water per capita in emerging economies begins to rise. Functioning water infrastructure and new technology deliver obvious benefits, strengthening public trust in water management.

Scenario 3: Data- and platform-driven water

Water availability and affordability

Global financial growth and better economic conditions encourage increased investment in water infrastructure, which improves water availability and affordability worldwide. More people have access to quality drinking water and modern wastewater treatment, especially in emerging and transition economics. However, increased wealth in emerging economies and shifting lifestyles grow demand for water, including the water needed for irrigation-based agriculture and food production. New food production technologies and water-efficient precision agriculture scale up in response.

Digitalization stimulates free markets and new growth, especially in emerging economies.

Water utilities and infrastructure

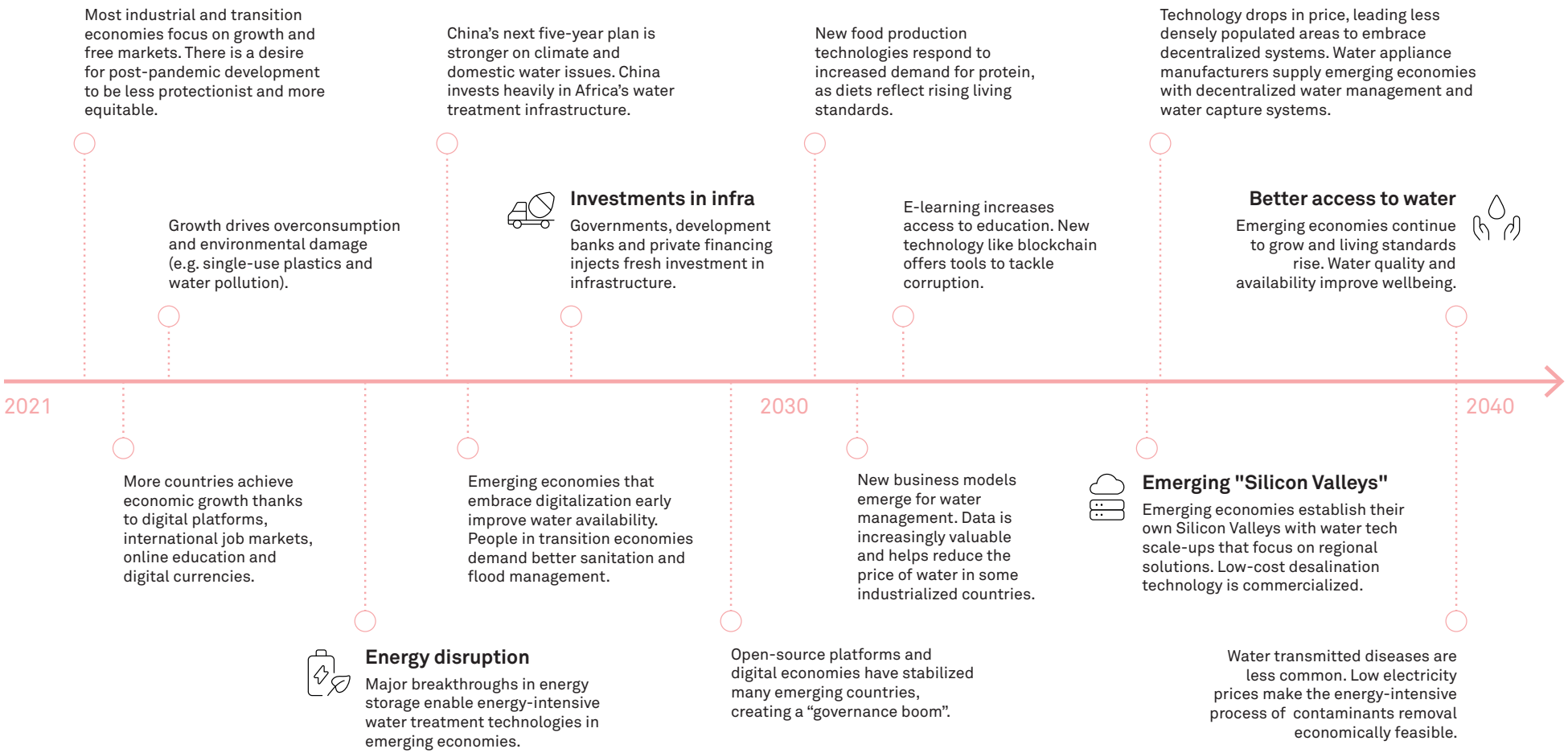
Economies in transition benefit from the presence of large competitive firms. These firms invest in energy infrastructure, R&D and job training, which creates a spillover effect that improves water management. With a stabilizing political situation, local water companies and capital-intensive water infrastructure become key investments for institutional and commercial investors. Water infrastructure expands. Commercial investors also track and monetize data on water related to, for example, consumer behaviors. Local water companies and utilities develop and deliver creative solutions for urban and rural areas thanks to fresh investment and external expertise.

Some older, more densely packed areas in cities retain centralized water infrastructure with the help of investor financing, but most megacities find solutions with semi-decentralized systems. Hybrid models and water reuse become dominant in rapidly growing cities in emerging economies. Communal drinking water tanks that use water recycling and water capture (e.g. from rainfall) improve water availability in lower-income communities, especially in fast-growing areas. These communities also benefit from wastewater gathering and sanitation services. By contrast, rural communities prefer decentralized and nature-based water management solutions that function without chemicals or large amounts of energy.

SCENARIO TIMELINE

Data- and platform-driven water

Indicative projections on how events might unfold



Scenario 4

Circularity and regulated water

Scenario 4: Circularity and regulated water

Economic model and climate change actions

International institutions such as the UN and EU have stronger roles. Climate action proliferates. People appreciate multilateral agreements and development schemes, seeing them as the foundation for sustainable development. Warmer cycles in the global temperatures show signals of slowing down, also thanks to universal zero emissions targets that have been strictly enforced. There is more focus on biodiversity; it is assigned economic value. In the post-pandemic world, economic growth is no longer the only measure of success.

Population growth becomes more moderate as access to education increases and gender equality improves. The pandemic has also changed the preference for city-living in some regions; urbanization decreases slightly.

There is more environmental regulation, raising the quality of water around the world. New environmental standards protect water sources and prevent damage from overconsumption. Laws determine minimum water levels for natural waterways (e.g. rivers, lakes), and restrict industrial and agricultural water use.

Consumer behaviour and technologial disruptions

Strong public pressure to improve water quality pushes regulators to order removal of micropollutants and microplastics. The EU is a first mover, taking a leading role in implementing new minimum requirements.

Water reuse is mandated in many countries. Wastewater and sludge become key sources of energy and nutrients and viewed as valuable raw materials - evidence of a strong shift to circular economy in many regions.

With more focus on the carbon footprint of water treatment, the sector improves efficiency. It becomes part of emissions trading. Nutrients are also traded in global markets (e.g. phosphorus credits).

Scenario 4: Circularity and regulated water

Water availability and affordability

Public-private partnerships and innovation improve water availability in emerging economies. Many countries begin covering the cost of water and electricity for lower-income communities in a bid to improve equitable access to and sustainable consumption of resources.

Public interest in water increases in many communities; people make collective decisions about water management. EU citizens, for example, become more conscious about their water footprint and water sources. Environmental education has increased in schools. As a result, people have a better understanding of water management.

Agriculture, however, remains an issue. Food production technology fails to advance quickly despite a supportive global agenda. The distribution and deployment of agricultural innovation is slow. In regions that rely heavily on agriculture, irrigation fails to keep pace with growing demand for food production. Despite climate change mitigation, places close to the Equator become unfavorable for farming. People look for new agricultural areas and more easily scalable solutions.

Water utilities and infrastructure

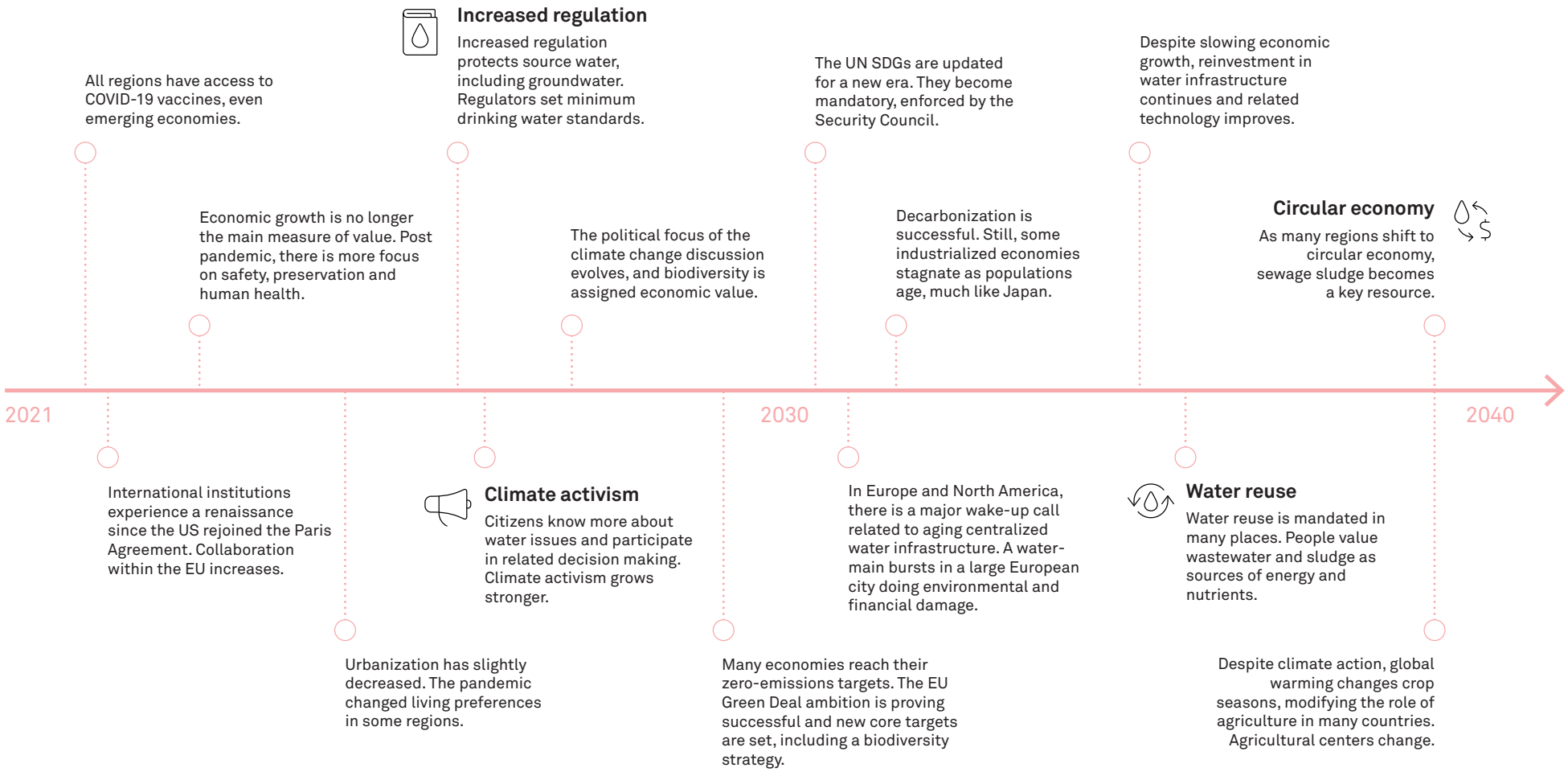
Aging centralized water treatment utilities in Europe and North America receive major investments from pension funds, as well as government lending at low interest rates. Green and blue bonds become key financial tools for funding new water infrastructure. Smaller municipal water treatment players merge with larger entities. Water treatment facilities embrace new materials while renewing old systems. Integration and smart features improve (e.g. predictive maintenance, sensors). The privatization of water treatment utilities discontinues. Centralized public systems become a trusted solution as municipalities implement new financially feasible solutions that improve water quality, such as micropollutant removal technology. Water resilience improves worldwide thanks to new water storage solutions.

Centralized public systems become a trusted solution.

SCENARIO TIMELINE

Circularity and regulated water

Indicative projections on how events might unfold



Methodology

Methodology

Scenarios are holistic descriptions of plausible future operating environments. They help the reader understand the development of the future operating environment, identify potential opportunities and prepare for alternative futures.

The scenario building process used in this research project was based on a systematic inductive scenario development method combined with the Delphi method. The Delphi method gathers knowledge and insights from experienced water experts.

The process consisted of three phases.

Phase 1: Identification of influencing factors

In the first phase, we conducted a scenario survey. Experts and water management professionals listed a number of disruptions and influencing factors (i.e. uncertainties and trends they expect to impact water management and water consumption by 2040). The objective was to carefully map the full range of influencing factors that will shape the future of global water supply, management and consumption.

This stage is based on unconventional and visionary thinking. Participants were invited to be courageous in identifying changes that were not just extrapolations of the current state. Also, the experts were asked to identify critical questions about the future of water. These questions highlighted interesting and important issues that guided the development of the scenarios. Based on experts' assessments, the uncertainty of the influencing factors was analyzed, as was their potential impact on water management.

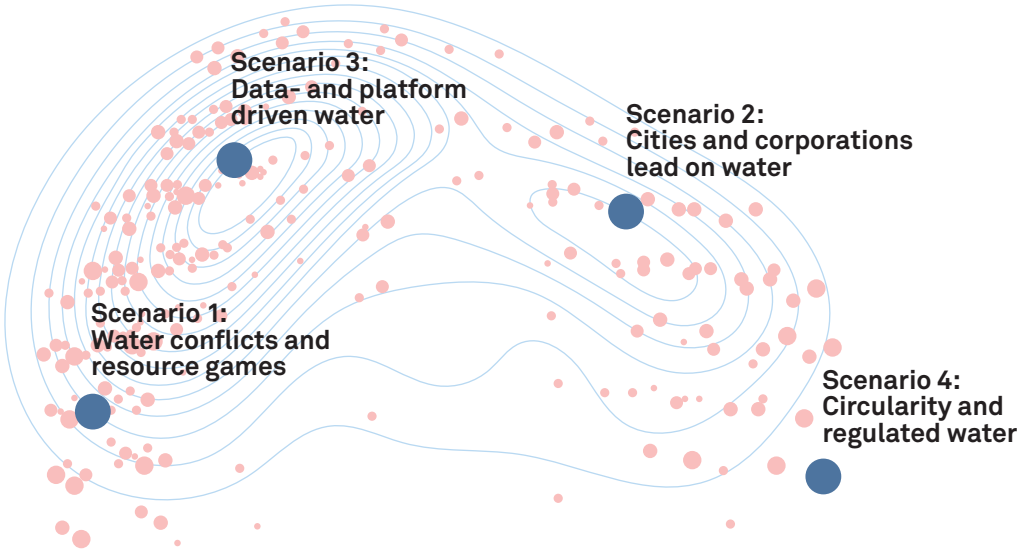
Methodology

Phase 2: Identification of logical scenario structures

In phase two, we compiled a futures table. The futures table summarized the key uncertainties that were identified in the scenario survey, interviews and other research. It included key uncertainties and alternative development outcomes.

Then the interdependencies and compatibility between different development alternatives were analyzed with the Scenario Builder™ – a proprietary developed by our research partner Capful. Scenario Builder™ uses consistency analysis and mathematical algorithms to produce an interactive scenario map with the most logical and coherent, yet different and interesting scenario sketches. A scenario sketch is a combination of certain outcomes of each uncertainty described in the futures table.

Again, the experts were interviewed and asked to further elaborate on the futures table and to comment on the structure and logic of the scenario sketches. They were invited to take a stance on each other's opinions and insights.



The Scenario Builder™ produced an interactive scenario map. The most consistent scenarios are plotted as pink circles. The four scenarios are marked on the map.

Methodology

Phase 3: Scenario descriptions

The four sketches were further developed into qualitative scenario descriptions. In addition, a scenario plot was created for each of the scenarios. It describes a series of key events that would lead from today to the end of the scenario in 2040.

Once more, the experts were interviewed and asked to evaluate if the scenarios met the criteria that had been established for adequate scenarios and to comment on the scenario plots and end-states. Based on their feedback, the scenarios were further refined.

As a result, there are four scenarios. They are not intended to predict the future, but to develop an understanding of how the future might unfold. The scenarios may seem more or less likely to different readers. The idea is not to choose one scenario and to consider it to be more plausible or preferred relative to others. Rather, it's to consider these alternative scenarios holistically. In reality, the future is likely a combination of different scenarios.

ADEQUATE SCENARIOS ARE...

Plausible	- not science fiction
Recognizable	- not alien
Challenging	- not boring or self-evident
Different	- not variations of the same theme
Consistent	- not illogical
Fresh	- not repeating old
Relevant	- not isolated from decision making

Criteria for adequate scenarios.

Futures table

As part of the process, we discussed some key uncertainties.
Here is a summary of those.

1	2	3	4
Economic models and population growth	**Climate action**	**Use of water resources**	**Environmental regulation**
What is the model of economy? *What is the volume and nature of economic growth?*	*What is the status of climate action and sustainable development?* *How are net-zero targets reached?*	*How will (global) water resources be used and who are the key actors?*	*How will the regulation of water treatment change?*
Circular economy becomes mainstream Multilateral agreements, steady economic growth, international institutions have key roles.	Global climate leadership Common actions for common good. International institutions play key roles. Slow but steady development.	Competition for water resources Increased use of land for food production. Global population growth demands space for food production.	Only necessary regulation Regulation develops more slowly than expected.
World of silos and linear business models Trade wars and blocks, conflicts, and insecurity. Significant growth in global population, overconsumption.	Unequal climate recovery schemes Climate action becomes a question of social status, achievable to those with means.	Water reuse widely accepted More rainwater and stormwater capture. More resource recovery (including from sludge).	Global regulation applied in regions Stricter regulation on water quality and treatment.
Growth of emerging economies Emerging regions develop. Moderate global population growth.	Consumer-driven change Large corporations and philanthropists dictate the path to zero emissions.	Water scarcity raising concerns Global water crises are more common. Regional differences in water access.	Regional regulation and differences Regulation on a more local level.

Futures table

Alternative future outcomes of selected uncertainties

5	6	7	8
Consumer values and trust	**Water availability and affordability**	**Water utilities infrastructure**	**New technologies and disruptions**
How will consumer behavior impact water management? *How do people perceive water?*	*What is the availability of water and who controls it?*	*What is the state of water utilities infrastructure?* *How are the investments funded?*	*How will digitalization and platforms change water management?*
Sustainability-driven consumers Eco-consumerism spreads to all consumer groups. More conscious water consumption; high trust in water quality.	Ownership of water Conflicts of interest on water assets and use. Financial value for water is defined and water trading increases.	New era of centralized water treatment Strong role of municipalities and public funding. Old infrastructure repaired.	Mature field falls behind on digitalization Digital transformation hindered by regulation, trust issues and the maturity of the field.
Individualism to the max Health-conscious, social media savvy consumers. Fear of micropollutants/micro-plastics. Data-driven water consumption.	Water availability improves but quality suffers Water availability improves in all regions, but new pollutants become a problem (e.g. batteries, new pharma).	Role of decentralized water treatment increases Treating water in smaller units, connected as hybrid-solutions to centralized systems. Public-private partnerships to rescue aging infrastructure.	New business models in water treatment The role of consumers increases. Water becomes as key source of data. New business models for municipal water treatment.
Lack of trust and varied consumers Climate change denialists, major differences between generations, regions and price sensitivity. Distrust of authorities and water quality.	Saving for an unrainy day Push for water conservation. Water is consumed carefully; efforts to minimize water leakages.	Small-scale water treatment Strongly decentralized water treatment (e.g. by blocks or streets). Water infrastructure becomes commercial investment target.	Digital innovations and new players Robust innovation and new startups, limited data ownership, major technological leaps with the support from digital platforms.

About Kemira

We at Kemira are in the business of chemistry expertise. Safe, sustainable chemistries are a part of good life. They play a key role in our everyday: ensuring hygiene, safe water, food safety and more. They enable us to utilize scarce resources more efficiently.

We are the chosen partners for water-intensive industries around the world, helping our customers design for efficiency, reuse resources, and revitalize natural systems. With over 100 years of experience, we partner with municipal water utilities, pulp, paper, board and tissue producers and companies in the energy sector to deliver visible improvements with our invisible enabler – the chemistry expertise of our 5,000 people.

Population growth, urbanization, and the increase in water consumption mean that the natural water cycle can no longer manage water pollution by itself. Without chemicals, safe water supply and sustainable wastewater treatment cannot be maintained.

Public concern about the environmental pollution caused by plastics, particularly plastic packaging, has speeded up the demand for alternative solutions. Fiber-based, renewable and recyclable materials are increasing in demand. We help the material producers with our expertise: chemistry underpins virtually every characteristic of fiber board used in packaging and secures raw material and energy efficient production processes. And while fossil fuels remain part of the energy system, we help the value chain meet ambitious sustainability performance targets.

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