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PROJECT

WATER

Water Quality

A GETTING STARTED GUIDE

Mahroo Shahbaz
Stephanie Bertels

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A GETTING STARTED GUIDE

Prepared by Mahroo Shahbaz and Stephanie Bertels.

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ABOUT THIS SERIES

This guide is part of our series of Getting Started Guides that supports your company to develop an embedded sustainability strategy. Each guide tackles a specific sustainability sub-issue and explores what your company needs to do to support the resilience of the environmental and social systems around you.

In each guide, we address relevant trends, system thresholds, key concepts, key actors, and key resources. We also offer guidance on how to address the impacts of decisions and activities in your operations and value chains as well as developing credible goals and outlining key corporate actions and internal targets that can help to provide clarity on the work ahead.

We recommend you read the first guide in the series, Getting Started Guides: An Introduction, which explains our overall approach and the value of setting a clear strategy anchored in your company's most material issues. It also explains how you can leverage process-based interim targets to clearly outline and track the specific actions that your company needs to take to achieve its high-level goals.

A complete list of focus areas and sub-issues can be found in our guide Scan: A Comprehensive List of Sustainability Issues for Companies.

This guidebook addresses the sub-issue **Water Quality**, which is part of the broader sustainability issue of Water.

Note: The issue topic of water is addressed over four separate guides:

This guide, ***Water Quality: A Getting Started Guide*** addresses supporting water quality through management and stewardship.

Water Management and Stewardship: A Getting Started Guide explains the water management – water stewardship continuum and how this continuum of action informs a credible water strategy. It provides a high-level overview of the current state of water, including social and environmental components; introduces the concept of water catchments that underpin the context in which action is taken; and explains how companies move between water management and stewardship approaches based on the contexts where they and their value chain partners operate.

Water Quantity: A Getting Started Guide, addresses supporting water balance through management and stewardship.

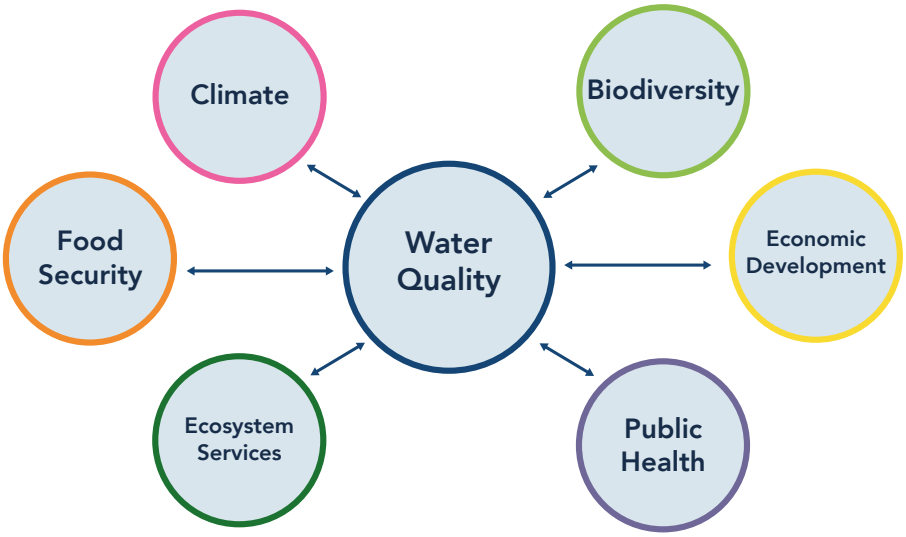
The upcoming series of guidebooks on Rights and Resilience in Communities will include ***Water, Sanitation, and Hygiene: A Getting Started Guide***, which will cover water, sanitation and hygiene within the context of supporting community wellbeing.

1 SETTING THE STAGE – ERODING WATER QUALITY

Water is vital to life. Communities, ecosystems, and businesses all depend on reliable access to safe and good quality water for their continued wellbeing. Good water quality is essential to human health and wellbeing, underpinning all aspects of life from food security to public health.

Yet, around the world, water degradation threatens human health, reduces ecosystem functioning, and hinders socioeconomic growth. As of 2024, the UN Environment Programme (UNEP) estimates that "only 56% of all monitored water bodies worldwide were classified as having good ambient water quality… [and that] the health and livelihoods of 4.8 billion people could be at risk by 2030." Recent research by the CDP also estimates that at least USD $77 billion is at risk due to water-related issues such as water scarcity and pollution.

Water can be contaminated in many different ways that threaten public health. Pathogens, toxic compounds such as mercury and arsenic, organic micropollutants from manufacturing and agriculture, microplastics, and more can accumulate in ground, surface, and coastal waters that communities use for drinking, bathing, growing food, and countless other everyday activities and can expose people to a broad range of health risks. For instance, water-related diseases, such as cholera, remain widespread, largely due to pathogens in untreated domestic and urban wastewater entering the environment. Furthermore, eroding water quality is estimated to negatively impact nearly one-third of global biodiversity. And, the World Bank estimates that deteriorating water quality is a key factor in reducing economic growth and exacerbating poverty by nearly one third in some countries.



Nearly all human uses of water can result in water pollution. Insufficient urban wastewater treatment, agricultural run-off, and industrial pollution are worsening water quality around the world.

The majority of the world's sewage enters our environment completely untreated, jeopardising nature and public health. Ineffective sewage systems play a significant role, with low-income

urban areas releasing a large proportion of wastewater directly into drainage channels or water bodies. UN Water estimates that "globally, 80% of wastewater flows back into the ecosystem without being treated or reused, contributing to a situation where around 1.8 billion people use a source of drinking water contaminated with faeces, putting them at risk." Furthermore, estimates suggest that only a very small fraction, in some cases less than 5%, of domestic and urban wastewater in "developing countries" is treated prior to its release into the environment.

As cities grow and urban demand for water increases, so will the quantity of wastewater generated, posing significant risks for water quality around the world if our wastewater treatment systems do not improve. While reliant on urban wastewater collection and treatment systems, companies must also understand how their products move through these systems and their impact on water quality through domestic effluents as consumers use and discard them.

Adapted from UN Water

Nutrient pollution from agricultural run-off also poses a significant threat to water quality. Fertilisers used in agriculture, primarily containing nitrogen and phosphorus, can be carried in water that flows from agriculture sites due to rain or irrigation systems, ultimately entering soil and water bodies. This can cause "groundwater pollution, loss of habitat and biodiversity, creation of coastal dead zones, harmful algal blooms, fish kills, and human health impacts." In recent years, anthropogenic sources have been estimated to contribute more than 70 per cent of nutrient loading in rivers.

In many areas, industrial sites also continue to discharge waste into water bodies without proper treatment. Industrial pollution containing hazardous chemicals and other compounds can enter the environment through these untreated discharges and leakages. The UNEP notes that "currently, more than 350,000 chemicals and mixtures of them have been registered for production and use. And, as a result of their use, many of these chemicals find their way to freshwater systems and coastal waters." The accumulation of these compounds in water, along with the toxic stress they cause, can have long-lasting implications for aquatic ecosystems, human health, and more.

Water pollution is also becoming a priority for policy makers. Policies and standards aimed at preventing and managing water pollution are prevalent around the world. Economic measures, such as taxes, fees, and fines account for 60% of environmental policy instruments that address water quality impacts, and over the last 20 years, policies offering positive financial incentives to address water pollution and restore water systems have also been on the rise.

Companies need to take action to understand water quality issues, how their operations and value chains may be directly or indirectly contributing to eroding water quality, and the cascading effects these impacts may have on their business, society, and the environment. They need to rethink their processes to ensure that their operations, value chains, and/or products are not negatively impacting water quality in the regions where they operate and enable support for interventions that improve water quality where systems are already under stress.

Note: *Sustainability issues are generally systemic issues, because they are deeply interconnected and rooted in complex environmental, social, and economic systems. In these guides, a system threshold is defined as the point at which the resilience of an environmental, social, or economic system becomes compromised. This occurs when the total impacts imposed on the system exceed its capacity to assimilate those impacts.*

SYSTEM THRESHOLD

Access to safe and sufficient water sources underpins the health and wellbeing of all life on Earth. Water quality issues can have significant long-lasting impacts, eroding water security, public health, food security, and biodiversity. Companies cannot continue to rely on water systems to assimilate pollutants and other water quality degrading components that result from their operations, value chains, and products. They need to understand their impacts on water quality and take action to ensure that they align with the resilience of water systems.

KEY TOPICS ASSOCIATED WITH WATER QUALITY

- Chemical contamination
- Biological contamination
- Radiological contamination
- Temperature
- Turbidity
- pH (acidity/alkalinity)
- Biochemical oxygen demand
- Micro-plastic contamination
- Colour, taste, odour, and appearance

2 KEY CONCEPTS IN WATER QUALITY

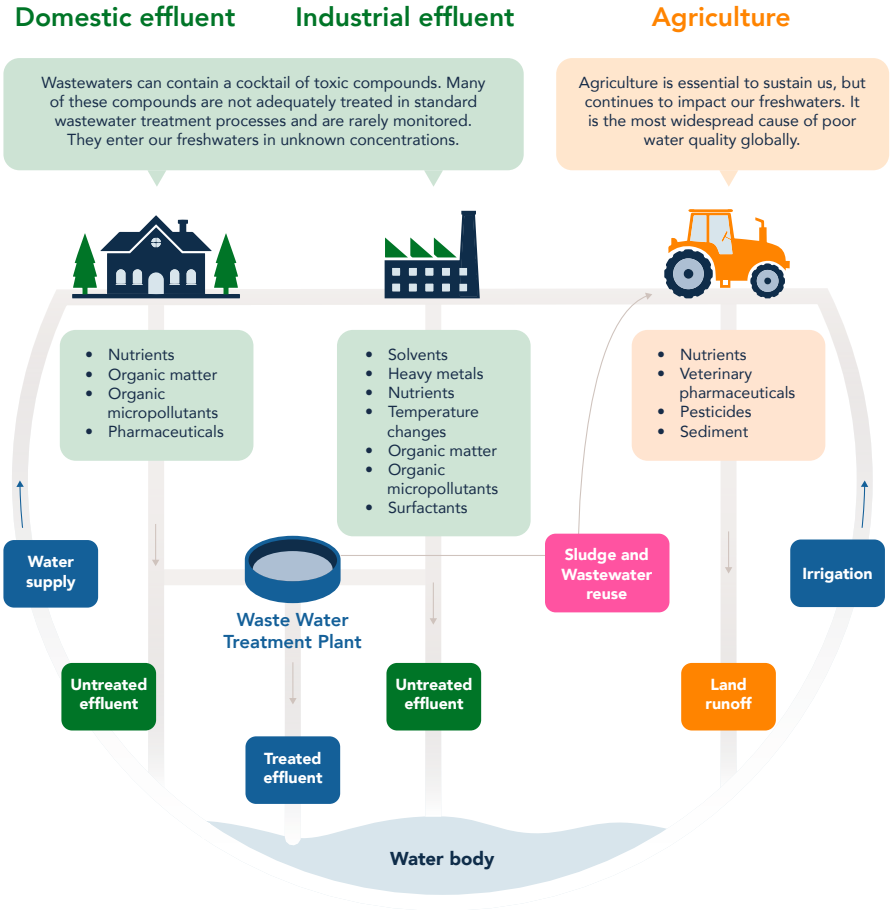
Water pollution, as defined by the World Wildlife Foundation (WWF), occurs "when toxic substances enter water bodies such as lakes, rivers, oceans and so on, getting dissolved in them, lying suspended in the water or depositing on the bed. This degrades the quality of water."

Water quality, as defined by the Alliance for Water Stewardship (AWS) Standard, is "the quality of a natural water body in terms of physical, chemical and biological parameters. The relevant quality standards are defined by national or local regulation and guidelines. Where these are absent, then international standards and guidelines should be applied. Good water quality status is where it meets the requirements of native flora and fauna, and for human needs where applicable."

Water quality factors

- biological indicators
- radiological indicators
- temperature
- turbidity
- pH
- dissolved oxygen
- nitrogen and phosphates

This graphic, adapted from UN Water, offers a visual explaination of how pollutants can enter water systems:



The Science-based Targets Network (SBTN) defines additional water quality terms that are important to understand when setting targets related to freshwater quality:

- ***Nutrient loading to freshwater*** is a "pressure indicator that describes the mass of nutrients (nitrogen and phosphorus) added to the environment from anthropogenic sources."
- ***Freshwater nutrient levels*** are a "state of nature indicator that describes the existing concentration of nutrients (nitrogen and phosphorus) in freshwater systems."
- ***Eutrophication*** is "the process of accelerated biomass growth in freshwater systems due to excess nutrient availability and the consequent oxygen depletion in the system."

Additional terms and definitions:

Water discharge: Water-related discharge from a site, including drainage, wastewater (effluent), used cooling water and irrigation surplus. The quality of discharged waters may range from good to polluted, depending on its origin, its use, and treatments applied.

Wastewater: Used water of reduced quality discharged from a site. It is usually contaminated in its raw state, but should be treated, either on site, or delivered (by pipe or truck) to an authorised wastewater treatment facility. Treated wastewater should be legally compliant and of a high enough quality to present no risk to the receiving water body (or land where applicable). Safe or treated wastewater may be re-used on site, or by other users to reduce original water demand and/or wastewater discharge volumes. Examples of re-use include irrigation of gardens or crops, washing vehicles, and other uses not demanding high quality water.

3 KEY PLAYERS IN WATER QUALITY

ALLIANCE FOR WATER STEWARDSHIP

The Alliance for Water Stewardship (AWS) is a global membership collaboration that contributes to the sustainability of water resources through the adoption of a universal framework for the sustainable use of water – the International Water Stewardship Standard. The framework helps water users to understand their impacts and offers guidance to achieve good water stewardship practices.

WORLD WILDLIFE FUND

The World Wildlife Fund (WWF) engages with businesses on water stewardship, releasing resources and collaborating with companies to integrate water stewardship. The WWF also fosters collaboration between companies, the public sector, and civil society to support transformational change.

CEO WATER MANDATE

The CEO Water Mandate is a commitment platform for business leaders and learners to advance water stewardship, in partnership with the United Nations, governments, civil society, and other stakeholders. The Mandate develops tools and resources, convenes stakeholders, and facilitates partnerships and collective actions that improve conditions in at-risk water systems around the world.

SCIENCE BASED TARGETS NETWORK (SBTN)

The Science Based Targets Network (SBTN) provides a Freshwater Hub that offers guidance on corporate water stewardship and science-based targets for freshwater. SBTN has also published detailed methodologies for companies to assess and prioritise impacts on freshwater quality and quantity.

UN-WATER

UN-Water is a coordination mechanism for the work of over 30 United Nations entities on water and sanitation issues around the world. It informs policy processes, addresses emerging issues, supports the monitoring and reporting on water issues, and builds knowledge for action.

4 COMMITTING TO TAKE ACTION – MID- AND LONG-TERM GOALS

Committing to take action on **Water Quality** can include addressing many of the key topics listed above. The mid- and long-term commitments that your organisation elects to make should be based on your identified priorities, areas of greatest impact, and your capacity to undertake the work required. It is important to note that this section does not provide all possible mid- and long-term goals related to this issue, but rather a sample of the goals that were most frequently adopted by companies in our research.

Common mid- and long-term goals and/or commitments on **Water Quality** include variations of the following:

Long-term goal: Zero impact on water quality from wastewater by 20[XX]

- Zero wastewater pollution by 20[XX].
- 100% of industrial wastewater is safely treated by 20[XX].
- Reduce untreated wastewater discharges into local water bodies by [X]% by 20[XX].
- Support the responsible development of local wastewater collection and treatment systems.

Long-term goal: Reduce nutrient levels in local water catchments to below safe standards

- Achieve an [X]% reduction in nitrogen and phosphorus loading to achieve the Total Maximum Daily Loads by 20[XX].
- Improve nutrient use and management systems to reduce nutrient loads and emissions to local water bodies.
- Decrease inefficient feed-livestock production processes to reduce nitrogen and phosphorus lifecycles in the food production system.

Long-term goal: Reduce the release of water pollutants into local water catchments

- Zero hazardous chemicals and materials released into water by 20[XX].
- Safe discharge from all manufacturing facilities by 20[XX].
- Address the accumulation of materials and chemicals in water, including through eliminating dumping and/or releases throughout operations and value chains and solutions for end-of-life.

Are you setting new goals or interested in benchmarking your goals against leading practice? Explore our Sustainability Goals Database for more mid- and long-term goals on **Water Quality**.

5 HOW TO GET THERE – PROCESS-BASED INTERIM TARGETS

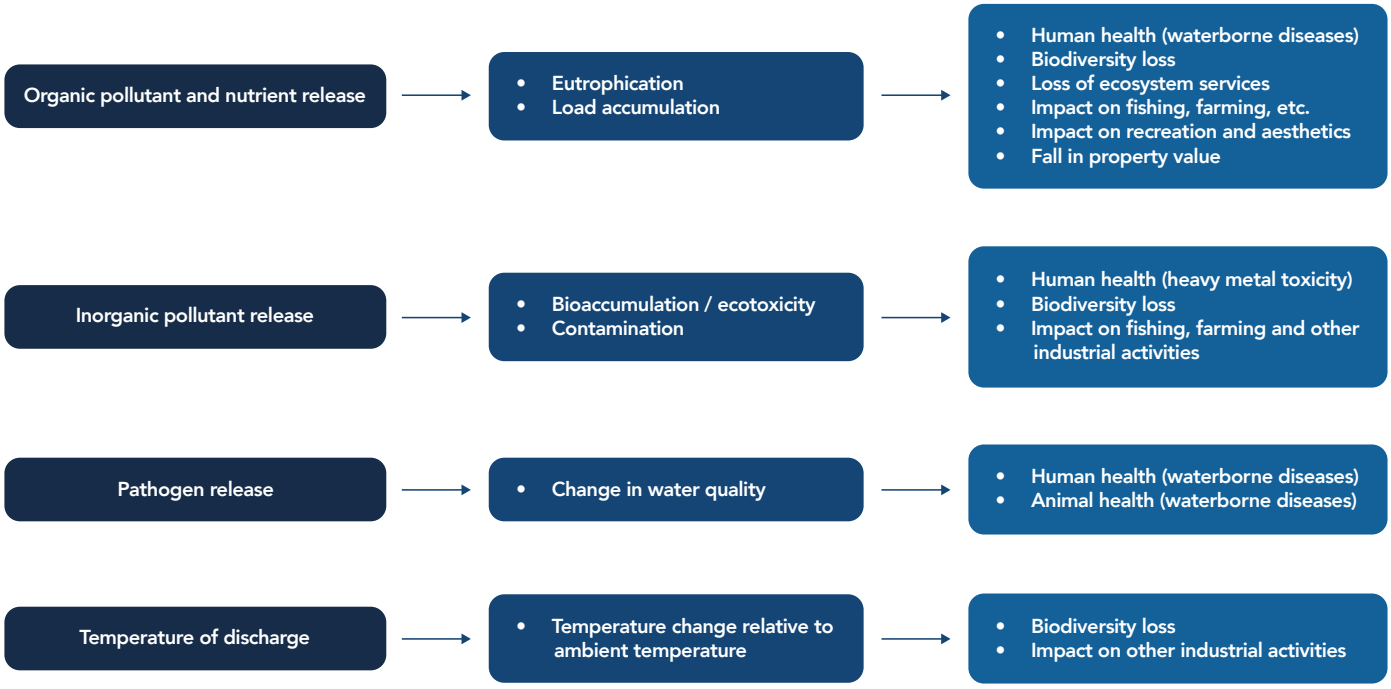
Note: *The following proposed timelines are only for guidance and are based on the pace outlined by other companies. The timeframe for actions and work for each step needs to be embedded in your organisational context, which may require different time allocations.*

The sequence outlined below assumes that your company has significant water quality impacts within its direct operations and that you will begin by learning and taking action to get your own house in order prior to engaging with your value chain. Whereas, companies where the majority of their water quality impacts reside within their value chain, may (and likely should) opt to engage with value chain partners at a much earlier stage.

YEAR 1: UNDERSTAND WATER QUALITY ISSUES

Explore how your industry, your operations, and your value chain may impact water quality – from excess nutrients or pollutants entering water supplies, through processes or products, to managing wastewater, each industry will interact with different indicators for water quality. Beginning with a strong understanding of how your company fits into the picture is key to targeting your efforts.

Identify priority pollutants that may have been named by local, national and/or international bodies and agencies as being of concern to catchments where you operate. Further your understanding of the different water quality factors, such as eutrophication, load accumulation, ecotoxicity, contamination, and more as they become relevant to your operational context.



Adapted from WBCSD

Much of the work to prioritise catchments and/or quality factors for action on water quality will occur concurrently within a broader water stewardship strategy – further guidance on key approaches to identifying priority areas can be found in Water Management and Stewardship: A Getting Started Guide.

YEAR 1: GATHER DATA AND ESTABLISH BASELINES

Gather data on the water quality factors for your site, including effluents and potential point sources (such as chemical storage or waste disposal), and non-point sources (such as runoff of agricultural chemicals or stormwater) of pollution. Align this with similar data on a catchment level, including the physical, chemical, and biological health of the catchment. If existing catchment level data is limited, you may need to consider conducting your own analysis of catchment water quality to establish a baseline.

This process may require measuring a range of indicators for water quality linked to your operations to understand where you currently stand on a site-level. For each industry and company, the indicators measured will vary based on their operational impacts. Leverage your learnings of local water quality issues to understand what parameters you should measure to establish a baseline and support effective decision-making. For example, your company may need to measure the quantity of water returned to original sources with degraded quality and the concentration of pollutants that were released within that effluent, as well as documenting the nature of those pollutants on aspects such as solubility, bioaccumulation, toxicity, and more.

For organisations that create products that may contain contaminants that ultimately erode water quality in later parts of their lifecycle, such as pharmaceuticals, personal care items, clothing, and agricultural chemicals, it is crucial to understand and quantify the impacts of these products at the point that they may enter water systems. While their discharge into water systems may be unintentional or out of your company's direct control once they are purchased by customers, these contaminants are increasingly entering marine environments, eroding water quality. Companies need to identify, estimate, and (where possible) document how these contaminants may impact the environment as a means to better understand and focus your efforts where they are the most relevant.

CASE STUDY: AstraZeneca assesses the risk posed by pharmaceutical ingredients in water

Recognising that, whether as a result of patient use or through manufacturing processes, pharmaceuticals can end up in aquatic environments and cause harm, AstraZeneca developed a EcoPharmacoVigilance Dashboard. As a part of the dashboard, the company "undertakes a quarterly search of the published, peer-reviewed scientific literature for reports of detection of environmental residues of [their] active pharmaceutical ingredients (APIs) in order to understand real world environmental risks." The data is publicly available through an interactive dashboard that can be filtered by substance, protection goal, environmental compartment, or region.

Examples of process-based targets for Year 1:

- By 20[XX], we will understand the potential water quality issues associated with our industry, our operations, and our value chain.
- By 20[XX], we will understand the primary source(s) of water pollution (such as nutrient run-off) in the catchments where we operate.
- By 20[XX], we will gather data to assess water quality impact from our sites and operations.
- By 20[XX], we will gather data on the state of water quality in the catchments where we operate.
- By 20[XX], we will establish water quality trends and baselines.

YEAR 2: UNDERSTAND WATER QUALITY-RELATED RISKS

Eroding water quality has significant implications for businesses. From physical risks, such as pollution or contamination that renders water unfit for use in operations, to reputational risks from shifting public opinion due to negative impacts on water quality, water risks are linked to water-related impacts. For example, the CEO Water Mandate offers the following example: "new source water pollution may require (through regulation or otherwise) a company to install expensive on-site pretreatment technology so that the water is of suitable quality for production processes." Your company needs to understand these water quality-related risks (often as a part of a broader water risk assessment).

CASE STUDY: Cargill assesses water quality risks from nitrogen

Cargill's commitment to reducing 5,000 metric tons of pollutants in water-stressed regions by 2030 is underpinned by an understanding of water quality-related risks facing their business. The company conducted a water risk assessment with nitrogen as a key water pollution indicator due to its relevance within the business. Ceres' Valuing Water Finance Initiative Benchmark Report highlights the company's comprehensive water quality risk assessment, noting that Cargill had gone beyond the limitations posed by available data sets to use "fine-scaled soil, water, and nutrient modelling techniques to estimate total nitrogen loading in watersheds along its value chain […and had] also employed a systematic monitoring system that measures the concentration of nitrogen or nitrogen equivalents over time, serving as a metric for assessing progress towards its water quality target."

YEAR 2: IDENTIFY BEST PRACTICE AND AREAS OF IMPROVEMENT

Identify industry, regional, and/or catchment specific guidance on best practice to reduce impacts on water quality in your operations. While this will look different for each industry and catchment context, it can include aspects such as improvements or redesigns for operational processes to improve wastewater management and reduce the release of effluents that impact water quality in local catchments. Explore whether practices such as wastewater reuse are viable for your operations and/or whether you can rethink product design from the beginning to reduce effluents.

Examples of process-based targets for Year 2:

- By 20[XX], we will establish a measurement process for our impacts on water quality from our direct operations and quantify baselines.
- By 20[XX], we will understand water quality-related risks.
- By 20[XX], we will identify relevant best practice for water quality.

YEAR 3: SET TARGETS

Set basin-specific and/or site-based targets that will align your organisation with the levels of water quality needed to ensure resilience and wellbeing – these should aim to bring your activities in line with national or local thresholds and goals for the catchment. While there may be several actors influencing a catchment's water quality, leverage the social, economic, and technical information that you have to determine your 'fair share' of the effort. WWF provides guidance on setting science-based water targets. It may also be helpful to explore Science Based Targets Network's (SBTN) freshwater science-based targets that explore setting goals for freshwater pollution resulting from nitrogen and phosphorus, as an example of how to undertake this work.

CASE STUDY: H&M sets context-based water quality targets

H&M has a set goal that "all supply chain wastewater is treated in a way that [the] receiving water body is not adversely impacted by effluent discharge" by 2030. To support this work, the company has set contextual interim targets that are specifically aimed at facilities within medium to high-risk basins. This includes targets for facilities in medium to high-risk basins to meet ZDHC Conventional Parameters - Progressive Level and have an "engagement plan with the responsible authority to enhance the discharge wastewater quality" by 2027, and for facilities in high-risk basins to meet ZDHC Conventional Parameters - Aspirational Level and have a "an action plan with the responsible authority to enhance the discharge wastewater quality" by 2029.

YEAR 3: DEVELOP AN ACTION PLAN

Target your efforts on processes and sites that have the greatest impact on water quality and prioritise improvements that are the easiest to implement to jumpstart the process. Train employees on assessing impacts to water quality and engage them within the planning process to support the uptake of the action plan at the site level. Establish processes and methodology to effectively track and analyse impacts on water quality to evaluate your progress.

Examples of process-based targets for Year 3:

- By 20[XX], we will set catchment and/or site-level targets for water quality impact (ie. quantity of pollutants discharged from operations, [X]% of industrial wastewater reused, etc...)
- By 20[XX], we will develop an action plan to reduce our impacts on water quality.
- By 20[XX], we will establish processes and methodology to effectively track and analyse impacts on water quality to evaluate progress.

YEAR 4: EXTEND YOUR LEARNINGS TO YOUR VALUE CHAIN

For many companies, the greatest impacts on water quality reside within their value chain. Leverage your learnings from your efforts in your operations to reduce water quality impacts throughout your value chain. Share your water quality targets and insights with suppliers to encourage a greater understanding of impacts, the risks it poses to business, and the importance of action. Prioritise engagement with suppliers that have the greatest impacts and aim to co-develop solutions such as wastewater recycling or rethinking of materials used during processes to minimise adverse impacts on water quality.

YEAR 4: SUPPORT SYSTEM-WIDE CHANGES

Explore where your organisation has a broader role to play in improving water quality in the communities and catchments where you operate. Identify industry and/or local initiatives that your organisation's efforts may align with to foster greater impact. Much of the work related to water quality is underpinned by the availability of robust and accurate data. Exploring if your company can support improved data collection and monitoring can also be an important pathway towards broader industry and system-wide changes.

CASE STUDY: Roadmap to Zero Programme's Zero Discharge of Hazardous Chemicals (ZDHC) guides chemical and wastewater management for the fashion industry

The Roadmap to Zero Programme is a collaborative, multi-stakeholder initiative that works within the fashion industry to phase out harmful chemicals that adversely impact water and land. They present cohesive expectations and guidelines for signatories to abide by, including wastewater discharge, sludge quality and disposal pathways. Signed by companies such as Adidas, Kering, and more, they align a range of actors to facilitate and push for broader systemic change within the fashion industry.

Examples of process-based targets for Year 4:

- By 20[XX], we will work with our suppliers to support the uptake of practices that reduce impacts on water quality across our value chain.
- By 20[XX], we will empower and train suppliers on practices to reduce water quality impacts in the production stage.
- By 20[XX], we will identify industry, local, and/or international collaboration opportunities to support systemic change towards the resilience of shared water resources.

RESOURCES

GUIDANCE

UNDERSTANDING WATER QUALITY ISSUES

These Factsheets on Water Quality Parameters from the Environmental Protection Agency (EPA) can help you to become familiar with common parameters for monitoring water quality. The fact sheets explore aspects of water quality such as temperature, dissolved oxygen, pH, turbidity, nutrients, macroinvertebrates, e. coli, metals, and habitat conditions. Each factsheet examines key questions related to why and how measurements are made for the parameter in question, what can affect the parameter (positively or negatively), and the challenges of using said parameter.

Pathway to the World Water Quality Alliance and its associated Assessment Pathways other quick insights about specific water quality issues and how water quality interacts with a range of different issues around the world.

TAKING ACTION ON WATER QUALITY

The Alliance for Water Stewardship (AWS) Standard will help you to understand your water use and impacts, and to work collaboratively and transparently for sustainable water management within a catchment context. The standard has five steps: 1) gather and understand, 2) commit and plan, 3) implement, 4) evaluate, and 5) communicate and disclose. The AWS also provides a certification process.

Putting Water Strategy into Context from the WWF was created to help businesses begin the process of embedding science-based water targets into their operations and strategy. It details six shifts that corporations need to make in the development of their water strategies and introduces a four-step approach to facilitate this change.

This business guidance on the assessment of wastewater-related impacts from WBCSD can help your company to better understand and manage the impacts of untreated and partially treated wastewater. It provides a standardised, 5-step process for measuring, valuing, and managing the impacts of wastewater generated by your operating sites or those of suppliers.

TOOLS

The Global Environment Monitoring System for Freshwater (GEMStat) provides water quality data from around the world on parameters such as pollutants, nutrient levels, and more.

The Wastewater Impact Assessment Tool from WBCSD aims to provide a site-level assessment of the pressures resulting from the industrial activities, allowing users to visualise the impacts of wastewater.

The Water Risk Filter uses 32 annually updated, peer reviewed data layers alongside a risk questionnaire to help you explore, understand, prioritise, and respond to water risks at specific sites. It is designed to be easy to use by non-water experts and includes information on water scarcity, low water quality, as well as regulatory and reputational risks.

Explore more resources on water quality here.

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