GUIDE TO WATER RISK AND STEWARDSHIP

Responsible Business Alliance

Advancing Sustainability Globally

ALLIANCE FOR WATER STEWARDSHIP™

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Introduction

Water stewardship, the responsible management and sustainable use of water resources, has become increasingly vital for the information and communications technology (ICT) sector. Though often overlooked compared to energy or raw materials, water is essential for key operations like semiconductor manufacturing, data center cooling, component fabrication, and the broader upstream electronics supply chain. As climate change intensifies, water-related challenges such as increasing scarcity, pollution, and extreme weather events, are escalating in severity and frequency. With less than 1% of the world's water readily available for human and ecosystem needs, ICT companies face mounting pressure to address water stress, comply with evolving regulations, and meet stakeholder expectations.

Water stewardship moves beyond efficiency or compliance to consider the shared, systemic nature of water challenges. It aligns business interests with community and environmental well-being while building the operational resilience needed to thrive in an increasingly water-stressed world. As the regulatory landscape becomes more robust, those who have implemented a water stewardship strategy are in a stronger position to respond to regulation.

This guide is based on "Water Strategy in the ICT Sector," co-authored by the Alliance for Water Stewardship (AWS) and the Responsible Business Alliance (RBA), and "Water Risk in the ICT Sector," co-authored by the RBA, AWS, and WWF. This guide is intended to be a practical roadmap for assessing water-related risks and crafting a strategy based on stewardship principles, and emphasizes the need for place-based, data-informed action that considers the shared and localized nature of water risk. The document is intended to facilitate member understanding, is for informational purposes only, and should not be relied upon for legal compliance purposes.

The Case for Water Stewardship

The AWS Standard defines water stewardship as the use of water that is socially and culturally equitable, environmentally sustainable and economically beneficial, achieved through a stakeholder-inclusive process that includes both site- and catchment-based actions.

Why Adopt a Stewardship Model?

Water stewardship offers a comprehensive approach to managing water-related business risk and opportunities through several key advantages:

Risk Management and Resilience Building:

- Tackles both internal vulnerabilities and external pressures ranging from water scarcity, quality issues and regulatory changes.
- Builds adaptive capacity and resilience to respond to climate and water shocks, extreme weather events, and shifting precipitation patterns.

Stakeholder Relations and Trust:

- Fosters trust with regulators, investors, and local stakeholders through transparent engagement and collaborative action.
- Demonstrates commitment to shared water sources and community wellbeing.

Regulatory Compliance and Reporting:

- Addresses double materiality requirements by considering both financial impacts on the business and the business's impact on water resources.
- Meets growing regulatory and reporting demands under comprehensive frameworks including:
  - The Corporate Sustainability Reporting Directive (CSRD):
    - A European Union regulation, which began phasing in for large companies in 2024, that requiring detailed disclosure of environmental, social, and governance (ESG) information.
    - For water stewardship, CSRD mandates companies report on their water-related impacts, dependencies, risks, and opportunities across their value chain. This includes information such as water consumption, pollution levels, and the effectiveness of their water strategies.
  - The Taskforce on Nature-related Financial Disclosures (TNFD):
    - TNFD provides a framework for organizations to report and act on evolving nature-related risks and opportunities.
    - Water resources are central to TNFD's scope, requiring companies to assess their dependencies on freshwater ecosystems, evaluate nature-related risks to their operations, and disclose how water scarcity or pollution might impact their business model.

These reporting frameworks represent a shift toward mandatory, standardized sustainability reporting, where water is both critical as a business resource and a shared environmental asset.

Business Value of Stewardship:

- Increased operational resilience and business continuity in the face of water risks
- Improved resource efficiency and optimization through comprehensive stewardship practices
- Strengthened brand reputation and investor confidence
- Better-performing, risk-aware supplier networks
- Enhanced alignment with ESG goals and decarbonization pathways
- Improved compliance readiness for evolving sustainability reporting requirements
- Competitive advantage through demonstrated resilience and stakeholder engagement

Water Risk in the ICT Sector: Start with Assessment

Water risk is not uniform; it varies by location, supply chain tier, production process, and even season. To act meaningfully, ICT companies must first gain a nuanced understanding of various risks in their operations, including across their value chains.

Water risks include, but are not limited to:

- **Physical risk:** Scarcity, flooding, pollution, or seasonal variability that can disrupt operations.
- **Regulatory risk:** Stricter water use or discharge regulations that could increase compliance costs or restrict access.
- **Reputational risk:** Damage arising from poor water management practices, especially in vulnerable communities.
- **Financial risk:** Business disruptions, supply shortages, or insurance liabilities tied to water events.

The following steps outline a practical risk assessment approach for the ICT sector. For more detailed information on water risks refer to the "Water Risk in the ICT Sector" report.

Step 1: Map Water Use and Exposure Across the Value Chain

Start by identifying water dependencies in your operations and upstream suppliers. Some examples of water-intensive processes in the ICT sector are:

- Microchip fabrication, which requires ultrapure water for cleaning and photolithography stages
- Printed circuit board (PCB) production, which involves wet etching, rinsing, and electroplating
- Data center operation, which relies on evaporative cooling systems

Checklist:

- [ ] Conduct double materiality assessment considering both financial and resource use by mapping inward and outward water dependencies and impacts in owned operations (e.g., for cooling, cleaning, chemical baths)
- [ ] Develop a site-level water balance map to understand usage and identify areas for improvement
    - Water balance = total input - (total output + water storage change)
- [ ] Assess indirect water use in outsourced production and critical suppliers (e.g. embedded water in a raw material or suppliers' owned processes)
- [ ] Identify processes and products with high water dependency (e.g., chip fabrication, PCB manufacturing)

This step helps determine where water is critical to your business and where risks are likely to occur.

Step 2: Conduct a Comprehensive Basin Risk Assessment

A comprehensive basin risk assessment includes understanding physical risk, regulatory and reputational risk, and infrastructure risk. Water issues increasingly drive community activism, legal disputes, and investor scrutiny, so assessing basin risk, including the non-physical aspects, can allow a company to prevent negative financial and reputational impacts.

Steps to address basin risk:

- Use the WWF Water Risk Filter tool to evaluate each site's exposure to:
  - Water scarcity (baseline and seasonal)
  - Water quality degradation
  - Flooding or extreme weather
  - Weak or under-enforced governance
- Identify whether your facilities or suppliers share water resources with agriculture, industry, or growing urban centers
- Track basin-level water policy changes, enforcement trends, and upcoming regulations
- Evaluate your exposure to permitting risks, discharge violations, or zero-liquid-discharge requirements
- Review supplier histories for fines, complaints, or controversies related to water use or pollution
- Monitor media coverage and NGO reports related to industry water practices in key regions

Example: In Chinese Taipei, severe droughts in 2021 required government-imposed water use restrictions, resulting in semiconductor facilities in the area being forced to reduce water intake and truck in water to maintain operations. This demonstrates how even advanced water-recycling operations can be disrupted by external supply chain constraints, highlighting the importance of basin-level assessments.

Checklist:

- [ ] Track changes in water permits, discharge limits, and basin-level governance
- [ ] Monitor supplier compliance with water laws and regulations
- [ ] Identify potential exposure to NGO campaigns, media scrutiny, or community protests
- [ ] Where appropriate, actively promote supply chain transparency through public disclosure of compliance information

Example: An ICT company in India experienced community protests after local residents claimed its suppliers' water withdrawal contributed to agricultural water scarcity. This triggered media coverage and internal reviews of supplier practices, illustrating the reputational risks that can arise from inadequate due diligence and poor basin engagement.

Step 3: Conduct an Operational Risk Assessment for High-Risk Sites

Operational risk assessments identify and evaluate potential disruptions to business continuity by assessing how sites depend upon and potentially impact water. Many companies focus on what they control internally and miss the broader, shared risks in the water catchments where they operate. A comprehensive approach that integrates both the entire catchment and external risk factors delivers more effective water risk mitigation and management strategies.

How to assess operational risk:

- Measure current water withdrawals and discharges at each site
- Evaluate wastewater treatment and water pollution prevention plans
- Evaluate reliance on municipal versus surface/groundwater sources
- Assess vulnerability of water-dependent processes to supply disruptions or quality issues
- Assess the water-related risks of climate change, developing emergency and long-term plans to adapt

Tools such as the WWF Water Risk Filter and the WWF Biodiversity Risk Filter are helpful to evaluate each site's dependencies and potential impacts on water as well as the biodiversity risks at a site.

Step 4: Prioritize High-Risk, High-Value Locations

Not all risks require equal attention. Focus on the intersections of water vulnerability and business importance.

Steps to prioritize locations:

- Identify which sites or suppliers are both high-risk and critical to operations within vulnerable catchments
- Prioritize catchments where both operational and basin risks are elevated
- Consider tier-2 and tier-3 suppliers as well as subcontracted supplier manufacturing sites in water-stressed regions, even if data access is limited

Checklist:

- [ ] Overlay water risk scores with business metrics (e.g., revenue contribution, supply chain criticality) at the catchment level
- [ ] Flag high-risk geographies where disruption would significantly impact continuity
- [ ] Prioritize action at supplier sites with high exposure and limited capacity to respond
- [ ] Map operations and suppliers to standardized catchment boundaries to maintain consistent risk assessment across operation

Example: In China's Lake Taihu Basin, PCB manufacturers face significant water-related challenges, including competition for water resources, particularly with the textile sector.

Pollution, flooding risk, and uneven enforcement of discharge regulations compound this risk. For ICT companies with critical or high-production sites in this region, these overlapping pressures make the basin a priority location for targeted assessment and action.

Step 5: Consider Urban and Coastal Vulnerabilities

Many ICT facilities are located in dense urban or coastal zones, where infrastructure stress and climate risks are amplified. You may need to consider the following:

- Urban areas often have overburdened water infrastructure, leading to service interruptions
- Coastal zones may face sea-level rise, saltwater intrusion, or typhoon-related flooding
- Megacities may enforce water rationing or price increases as demand outpaces supply

Checklist:

- [ ] Map sites exposed to sea-level rise, drought, storm surges, or flooding
- [ ] Engage with city or basin authorities on joint infrastructure solutions
- [ ] Anticipate long-term water availability challenges in megacities

Example: Data centers in Chennai (India), Phoenix (USA), and Johannesburg (South Africa) are exposed to water stress that threatens cooling operations. In Chennai, commercial operations were impacted when municipal authorities imposed water shutoffs due to extreme drought.

By combining physical, regulatory, and reputational perspectives, ICT companies can build a dynamic and location-specific picture of water risk. This enables proactive strategy development that reflects business imperatives and basin realities.

Turning Assessment into Action: Building an Effective Water Strategy

Once risk assessments are complete, companies must convert insights into a practical, scalable strategy. This strategy should be tailored by geography and supply chain tier, while being flexible enough to evolve with changing conditions. It should be noted that the approach may vary depending on company size and role in the value chain. While approaches may differ, there are common foundational elements, which are highlighted below.

1. Establish Internal Ownership and Strategic Priorities

Start by clarifying who is responsible for driving water action. This includes:

- Assigning water responsibility to senior leaders and sustainability or Environmental Health and Safety (EHS) teams

- Forming cross-functional working groups across procurement, operations, and legal departments
- Articulating a corporate water vision that reflects the company's risk exposure, values, and ESG targets

2. Develop Measurable and Contextual Water Goals

Effective water strategies move beyond broad efficiency statements. The WWF resource Contextual Water Targets: A practical guide to setting contextual Corporate- and site-level water targets is a useful guide to set targets that reflect basin realities and business dependencies. The resource lists the following steps:

- Set site-specific water efficiency or quality goals based on local availability and pollution challenges
- Define supply chain water goals (e.g., percent of tier-1 suppliers with water action plans in high-risk regions)
- Incorporate goals on collective action or community engagement
- Should include SMART Targets that are; Specific, Measurable, Actionable, Relevant and Timebound

3. Build and Resource Action Plans

Turn strategy into implementation by developing resourced, time-bound action plans. Steps to do this include:

- At the site level, build plans addressing local challenges (e.g., cooling efficiency, process water recycling, discharge treatment upgrades)
- Maintain current water balance mapping to monitor facility water flow, ensure pollution prevention, and track water-related KPIs
- With suppliers, incorporate water management practices into responsible sourcing programs and audits, building a foundation for future collaboration on water strategy
- At the corporate level, fund initiatives in key basins and report progress publicly

4. Engage Externally for Shared Solutions

Water risks are shared. Even the best internal programs cannot ensure resilience if basin-level issues persist. By working collectively with various stakeholders shared water challenges can be addressed. For example, companies could opt to:

- Join or establish diverse collectives in high-risk regions in which they operate, prioritizing initiatives with genuine multi-stakeholder inclusivity, for example: industry coalitions (e.g., AWS and the RBA), NGO-led partnerships (e.g., WWF), and local watershed councils

- Participate in basin-level partnerships where companies pool resources for watershed restoration, coordinate their water use timing, and jointly invest in water stewardship innovations and infrastructures
- Engage in catchment-level collaboration initiatives, including sharing best practices, advocating responsible water stewardship, and coordinating stewardship efforts across industries by collaborating with NGOs, utilities, and other industries to support sustainable water management through public-private partnerships and community engagement

Example: In Chinese Taipei's Hsinchu Science Park, an industrial complex that's home to some of the largest semiconductor manufacturers, water stress is a shared problem, especially during drought periods. To promote collective action, companies in this region could coordinate maintenance schedules to avoid peak water demand conflicts, share advances in water treatment technologies, and jointly invest in basin-level water infrastructure such as wastewater treatment facilities or a water recycling strategy.

Water Stewardship Implementation Assessment

After working through the checklists provided in this guide and developing your organization's water strategy, use this assessment to determine your organization's progress toward implementing water stewardship.

Strategic Foundation

- [ ] Internal champions identified and trained
- [ ] Leadership endorsement and budget allocated
- [ ] Stakeholders identified and communications plan developed
- [ ] Opportunities for collective action at the catchment level identified

Risk Assessment

- [ ] Facility and supplier-level water risks qualified
- [ ] Map water balance to understand usage and areas for improvement
- [ ] Catchment-level data gathered using reputable tools
- [ ] High-risk, high-impact sites prioritized

Planning and Target Setting

- [ ] Localized plans developed
- [ ] Developed management and mitigation rules for water conservation, pollution prevention, and wastewater treatment
- [ ] Quantitative goals set for water usage
- [ ] Performance targets benchmarked to catchment needs
- [ ] Supplier engagement underway in high-risk regions

Implementation and Review

- [ ] Stewardship integrated into core business processes
- [ ] Partnerships in place for catchment collaboration
- [ ] KPIs tracked and reviewed for continuous improvement
- [ ] Sectoral and technological improvements monitored to ensure understanding of new and improved stewardship strategies
- [ ] Transparent reporting on water stewardship activities and regulatory compliance

Upon reviewing the checklist, organizations may find that not all elements are fully in place. Water stewardship is a long-term, iterative process that builds upon a foundation of sound water management. Gaps in data or stakeholder engagement should not be viewed as shortcomings, but rather as opportunities to prioritize and phase in additional actions. The checklist above is intended to support organizations in both identifying where they are today and where to focus next.

Key Takeaways

- **Water is a strategic resource.** ICT companies depend on reliable, high-quality water across their value chains.
- **Risk is local.** Understanding and acting on catchment-specific risks is essential.
- **Most risks lie deeper within the supply chain.** Supplier engagement is critical for meaningful impact, extending beyond tier-1 to address hidden risks.
- **Transparency builds trust.** Public reporting on water practices strengthens stakeholder relationships.
- **Stewardship is collaborative.** No company can solve water risk alone.
- **Collective action delivers shared value.** Collaboration creates economies of scale for water risk mitigation.
- **ICT can lead.** Innovation and influence make this sector uniquely positioned to drive change.

References and Resources

For further guidance on the information in this document, companies can refer to the following resources, all linked:

- Alliance for Water Stewardship Interoperability with Disclosure Frameworks: Final Results
- AWS International Water Stewardship Standard (AWS Standard)
- AWS Water Stewardship Training Program
- CEO Water Mandate Site Targets Guide
- Contextual Water Targets: A practical guide to setting contextual Corporate- and site-level water targets
- CSRD
- RBA Code of Conduct
- The Embedding Project
- TNFD
- Unpacking Collective Action in Water Stewardship
- Water Risk in the ICT Sector
- Water Strategy in the ICT Sector
- World Resources Institute's Aqueduct Water Risk Atlas
- WWF Guide- Putting Water Strategy into Context
- WWF's Biodiversity Risk Filter and Water Risk Filter

Definitions

Basin Risk Assessment: An assessment conducted to evaluate external water risks, such as scarcity, flooding, and quality issues, in the geographic area of an operation site location (ie., the water risks a site may face due to its location).
Basin Risk: Risk that comes from the overall conditions of the watershed or catchment area where a company operates. This includes risks from water availability, pollution, weak infrastructure, and competing demands from other basin users.
Biodiversity: The variety of life in a particular habitat or ecosystem. Increased biodiversity enhances ecosystem stability, resilience, and productivity, while also supporting clean air and water for human health.
Catchment/Basin: A geographical area where all rainfall and surface water drains into a common body of water. Also referred to as a watershed, it forms a natural boundary for assessing water risk.

Collective Action: A coordinated effort by a group of people to achieve a shared goal or address a common problem.
Dependencies: How and where a company sources and relies on water for its business operations and continuity.
Double Materiality: Sustainability reporting that considers both the impacts of the company on the environment as well as the environmental impacts on the company.
Impacts: How a company's operations affect water resources, within a local and broader context, either positively or negatively.
Operational Risk Assessment: An assessment conducted to identify how a company's own water practices and usage at specific sites interact with the local water context (i.e.., how the site is doing based on its own water activities).
Operational Risk: The potential for disruptions in business operations due to dependencies on water for cooling, cleaning, processing, or other critical functions.
Physical Water Risk: Risk related to the physical availability or quality of water, such as droughts, flooding, seasonal variability, or pollution.
Regulatory Water Risk: Risks that stem from changes in water-related laws, permitting, discharge limits, or enforcements that may increase costs or limit access to water.
Reputational Water Risk: Risk of damage to a company's public image due to poor water management, particularly when operations affect local communities or ecosystems.
Site-level Water Balance: The sum of total output of water and change in water storage minus the total input of water.
Water Stewardship: The use of water that is socially and culturally equitable, environmentally sustainable and economically beneficial, achieved through a stakeholder-inclusive process that includes both site- and catchment-based actions.

Acronyms

AWS: Alliance for Water Stewardship
CSRD: Corporate Sustainability Reporting Directive
EHS: Environmental Health and Safety
ESG: Environmental Social and Governance
ICT: Information and Communications Technology
KPI: Key Performance Indicator
NGO: Non-Governmental Organizations
PCB: Printed Circuit Board
RBA: Responsible Business Alliance
TNFD: Taskforce on Nature-related Financial Disclosures