

# WATER RISK IN THE ICT SECTOR: THE CASE FOR ACTION

In collaboration with:



Responsible Business Alliance

Advancing Sustainability Globally



## ABOUT THE AUTHORS

**In this report, the Alliance for Water Stewardship (AWS), the Responsible Business Alliance (RBA) and WWF have combined their expertise on water stewardship and the ICT sector to raise awareness of water impacts and demonstrate the opportunities that can be created through positive action.**

**This work was made possible by a multi-year partnership between Apple and AWS to catalyse uptake of water stewardship throughout ICT supply chains. Together, Apple, RBA and AWS have launched an ICT Water Stewardship Working Group to share learning and encourage collaboration throughout the sector. The group has played an important role in developing this report. Members of the Working Group include representatives from: Apple, AWS, Cisco, Dell, Intel, Jabil, Lenovo, RBA, Samsung Austin Semiconductor LLC, Seagate and WWF.**

## Throughout ICT supply chains, water has the potential to pose a significant risk to business continuity and supply chain resilience in the face of the climate emergency.

Flooding or drought can result in disruption, sometimes with little warning, particularly in the parts of the supply chain that are significant consumers of water. Increasing awareness of the impact of chemical wastewater on local water quality can lead to changes in regulations, perhaps at short notice following a pollution incident, creating disruption in the supply chain whilst suppliers respond to new requirements.

Factories face disruption to business continuity if their staff lack access to safe water, sanitation, and hygiene at home and at work, leading to staff absences and potential delays in meeting client deadlines. Brands are exposed to reputational and financial risk if they are found to be linked to a supplier that is having a significant negative impact on the environment, whether it is from local community outcry or heightened media scrutiny, creating customer concerns. This could hinder supply chain continuity and impact the delivery of products and customer/client relationships. In turn, investors can be exposed to similar reputational and financial risks, if the companies they invest in are not sufficiently aware of their water impacts and fail to respond effectively.

Whilst the types of water risk may look very different to different parts of the supply chain and in different locations around the world, one thing is certain: the ICT sector needs to increase awareness of the vital role of water throughout the supply chain and build resilience to ensure that all stakeholders are empowered to respond effectively.

The growing demand for technology means that the ICT sector has the potential to have a significantly larger impact and dependency on water in the future. Acknowledging this, and taking bold collective action, has the potential to catalyze and enable innovation that addresses sector-specific water challenges. The sector also has the opportunity to enable others to find solutions to shared water-related challenges, especially in urban environments that are strategic to the ICT sector.

The purpose of this report is to explain how water can create risks for the ICT sector and set out the benefits of adopting water stewardship as the response. The report focuses first on impacts and opportunities for individual businesses throughout the supply chain, before turning to opportunities at the sector-level as part of the response to water risk.

The report begins with the possible water-related impacts and dependencies associated with individual businesses operating within the sector and at a sectoral level. Then, in Part 2, it outlines the general benefits of adopting water stewardship as an approach to managing water-related impacts and dependencies. Finally, in Part 3, the report sets out practical areas in which businesses within the ICT sector could collaborate across a range of initiatives to help establish the sector as a water stewardship leader. Through sector-level collaboration, ICT businesses can reduce the barrier to entry for implementing water stewardship for businesses deeper within the supply chain, resulting in a collective sectoral reduction in impacts and dependencies on water.

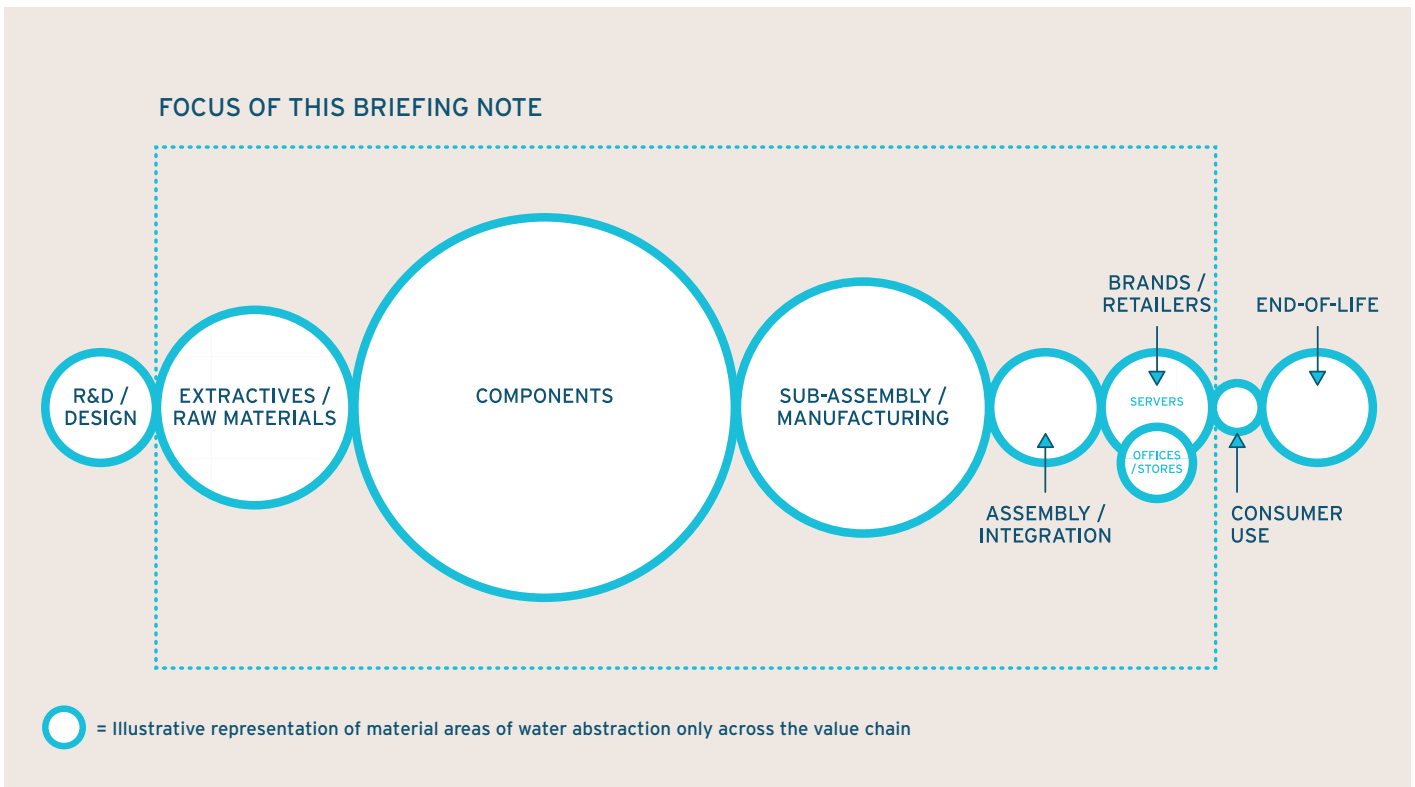


Figure 1: Illustrative representation of a generic ICT sector value chain showing a representational distribution of material areas of water abstraction impacts and dependencies (note this figure does not illustrate water quality impacts/dependencies)

### Where does water touch upon the ICT supply chain?

Water is a highly localized resource and each business' impacts and dependencies on it are contextual. The last decade has seen a rapid adoption of technology globally and meeting this future demand has the ability to rapidly grow the sectors' impacts and dependencies on water. Users of the services and products delivered by the ICT sector are also increasingly looking to technology to support them in reducing their water impacts and dependencies. These needs are fueling innovation and solutions aimed at solving these issues for customers and represent an unprecedented opportunity for the sector to carve out a niche role for itself within the water stewardship landscape.

Businesses that make up the ICT sector are highly diverse with respect to the products and services they provide (for

example, software and services; technology hardware and equipment; semiconductors and semiconductor equipment; and communication services). In addition, the advancement of technologies means these 'traditional' classification boundaries are becoming even more blurred (for example, consumer discretionary and automobile components). With such diversity of businesses, it is almost impossible to single out a set of typical impacts and/or dependencies that is specific to the ICT sector. However, there is anecdotal evidence suggesting that the distribution of material water impacts and/or dependencies (based on a highly generic ICT sector supply chain) follows similar patterns to other sectors (see Figure 1) – these typically lie deeper within a supply chain. This briefing note focuses on a specific part of the value chain, as indicated within Figure 1, but opportunities also exist within the consumer use, end-of-life, and in the R&D/design stages.

Accounting for impacts and dependencies through the supply chain broadens how a business considers its role in managing these impacts and dependencies. For a brand or some types of suppliers, water risks are present largely within the supply chain rather than in owned operations, requiring a response which goes beyond areas within a company's direct control. At a sectoral level, understanding the array of risks present throughout the supply chain, and accounting for water in this way, provides a common basis for communication of water-related impacts and dependencies and can facilitate the identification of crosssector areas of collaboration.

### What are some of the potential water-related risks and impacts facing the ICT sector?

To identify possible sector level water-related risks, that could be used to inform a collective water stewardship response by the ICT sector, WWF ran more than 3,000 locations through the WWF Water Risk Filter tool (WRF). The anonymous sites were provided by the Responsible Business Alliance (RBA), which represents all tiers of the electronics supply chain through its more than 165 members. The data includes self-reported due diligence activity throughout multiple supply chains, and therefore represents a reasonable cross section of businesses on which sectoral level insights could be informed. This data was first categorized according to the primary activities undertaken at each location before a basin risk assessment was run for all locations.

The WWF WRF basin risks are structured within a three-tiered framework, which are aggregated to form the 'Overall risk'. Within

this framework risk types ('Physical', 'Reputational' and 'Regulatory') are informed by risk categories. For example, 'Physical' risk is broken down into 'Scarcity', 'Flooding', 'Water Quality' and 'Ecosystem Service Status'), which are in turn informed by indicators (for example, 'Scarcity' is broken down into 'Aridity', 'Water Depletion' and so on). Each of the 32 indicators within the WWF WRF is derived from freely available external, peer reviewed global data sets. The final outputs of the Overall risk, risk types, risk categories and indicators are classified using a 1-to-5 value scale ('Very High', 'High', 'Medium', 'Low' and 'Very Low').

Figure 2 shows the summary risk data for over 3,300 sites that were assessed by the Water Risk Filter. The data shows several useful insights. Overall, the ICT sector is particularly exposed to physical and reputational risk throughout the supply chain. Over 80% of locations face Very High and High levels of flooding, and 68% face Very High and High levels of risk due

to water quality (Figure 2). This aligns with experience, such as the extensive supply chain disruptions caused by the 2011 flooding in Bangkok, Thailand, within the Mekong and Chao Phraya basins.

Beyond flooding, water quality, degraded ecosystems and associated reputational risks are other major challenges facing the sector. However, water is highly localized and the insights shown in Figure 2, while useful as a starting point for a sectoral conversation, do not fully describe highly localized risks (for example, regulatory water risks may 'appear' lower in this assessment but may be more applicable to certain regions when these regions are considered in isolation). Conversely, water scarcity in basins tends not to be a major challenge for many locations, with only 15% of the sites facing Medium to High levels of water scarcity risk.

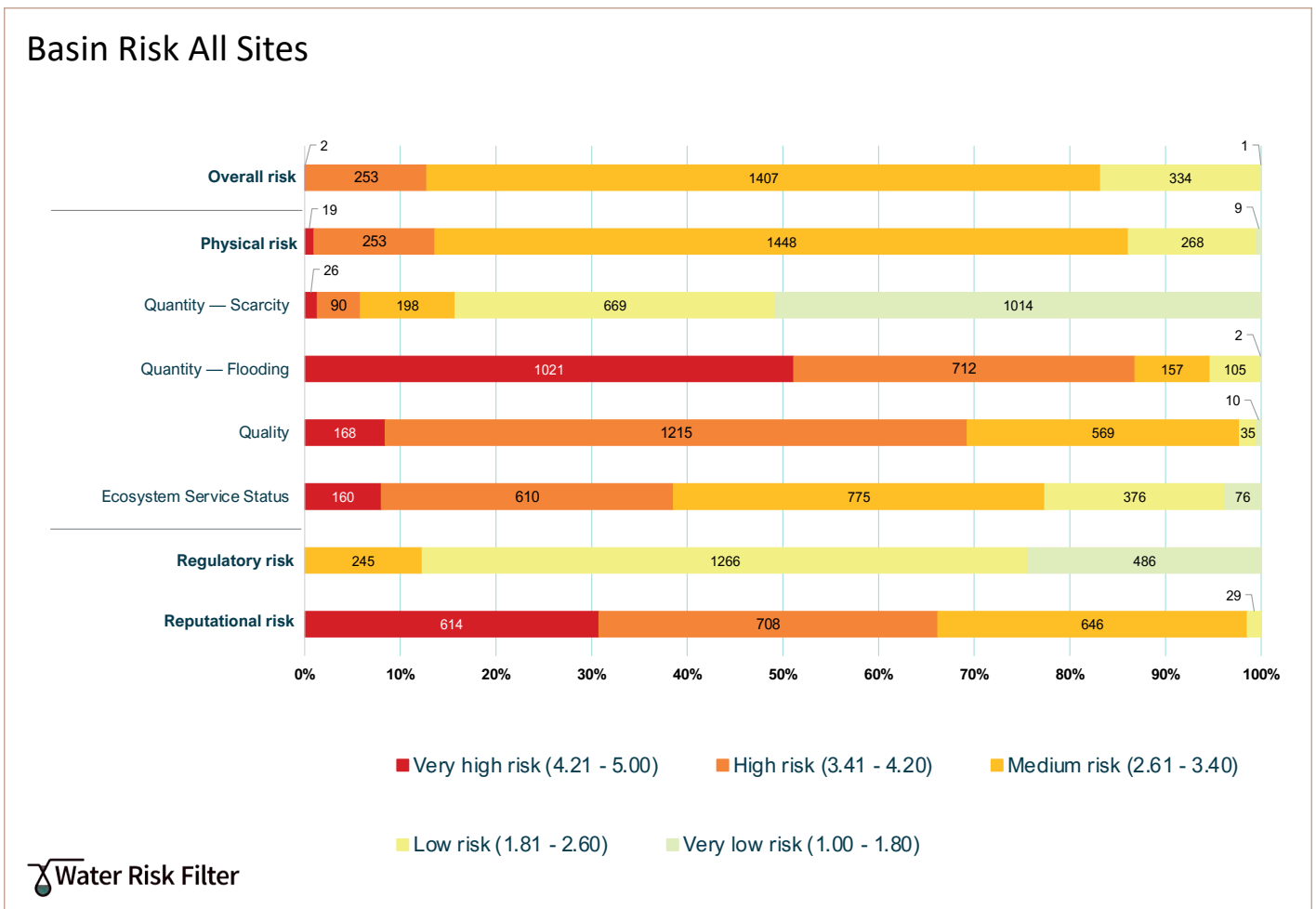


Figure 2: Summary of Physical, Regulatory and Reputational Basin risks faced by over 3,300 ICT supply chain facilities



### Distribution of supplier locations

The distribution of the locations across the major river basins (Figure 3) shows that the Taihu, Dong and Zhu river basins are material to the ICT sector. Despite the top basins all being in China, the local context of water is important, and this means that the water risk profiles of these basins varies. In general, the Taihu has greater Physical water risks compared to the Dong and Zhu, while all share similar Regulatory and Reputational water risk profiles. While traditionally the activities of the ICT sector are commonly associated with Asia, there are other non-Asian basins that have high concentrations of electronics production facilities, including the Danube (Europe), Colorado (U.S), Great Lakes (U.S) and Rhine (Europe). Figure 3 shows the top 15 river basins for the ICT sector in terms of the number of supplier locations, broken down by type.



Colorado River, Arizona, US. Credit: Nfoto

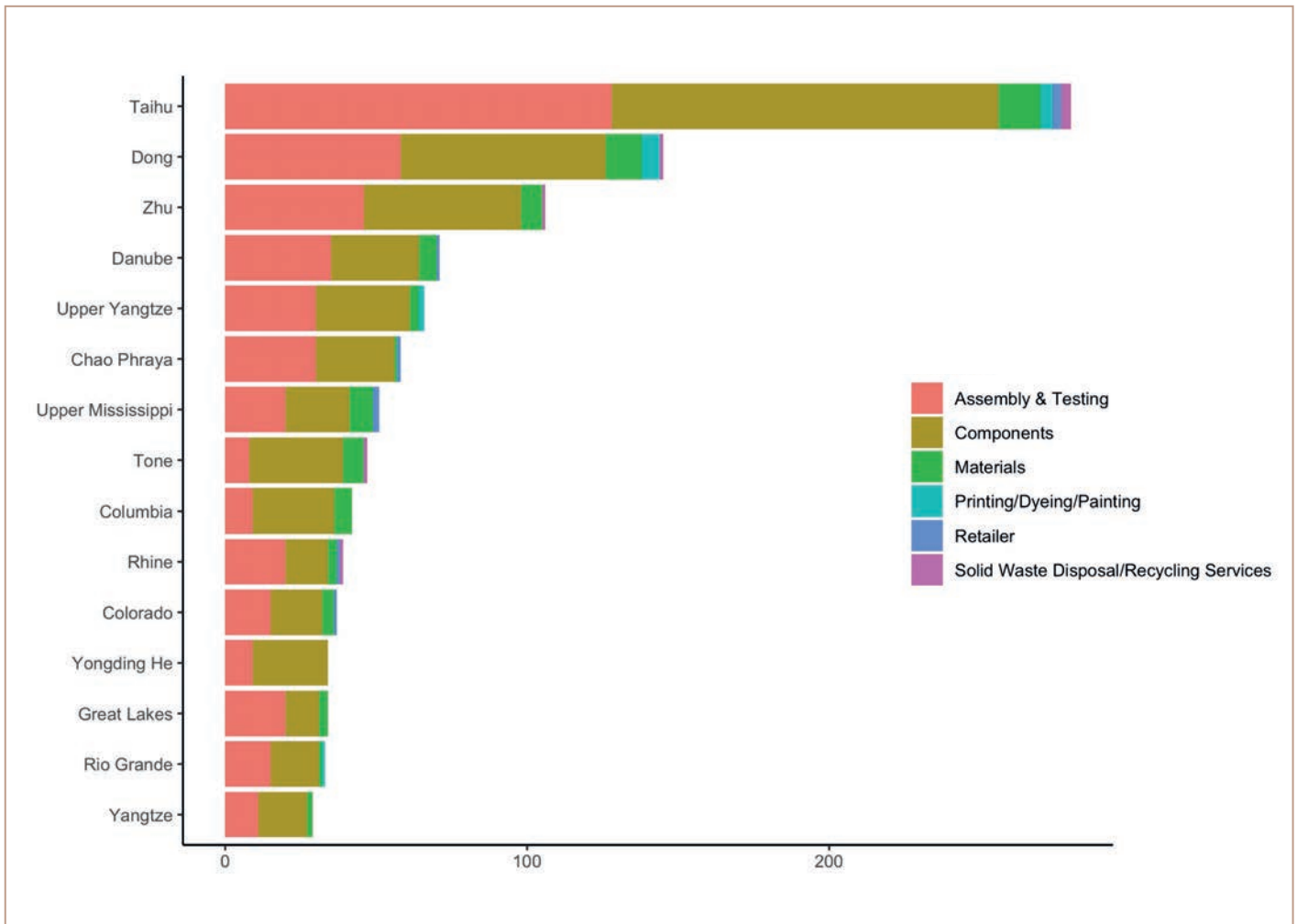


Figure 3: Distribution of over 3,300 supply chain facilities (by primary activities) across major basins

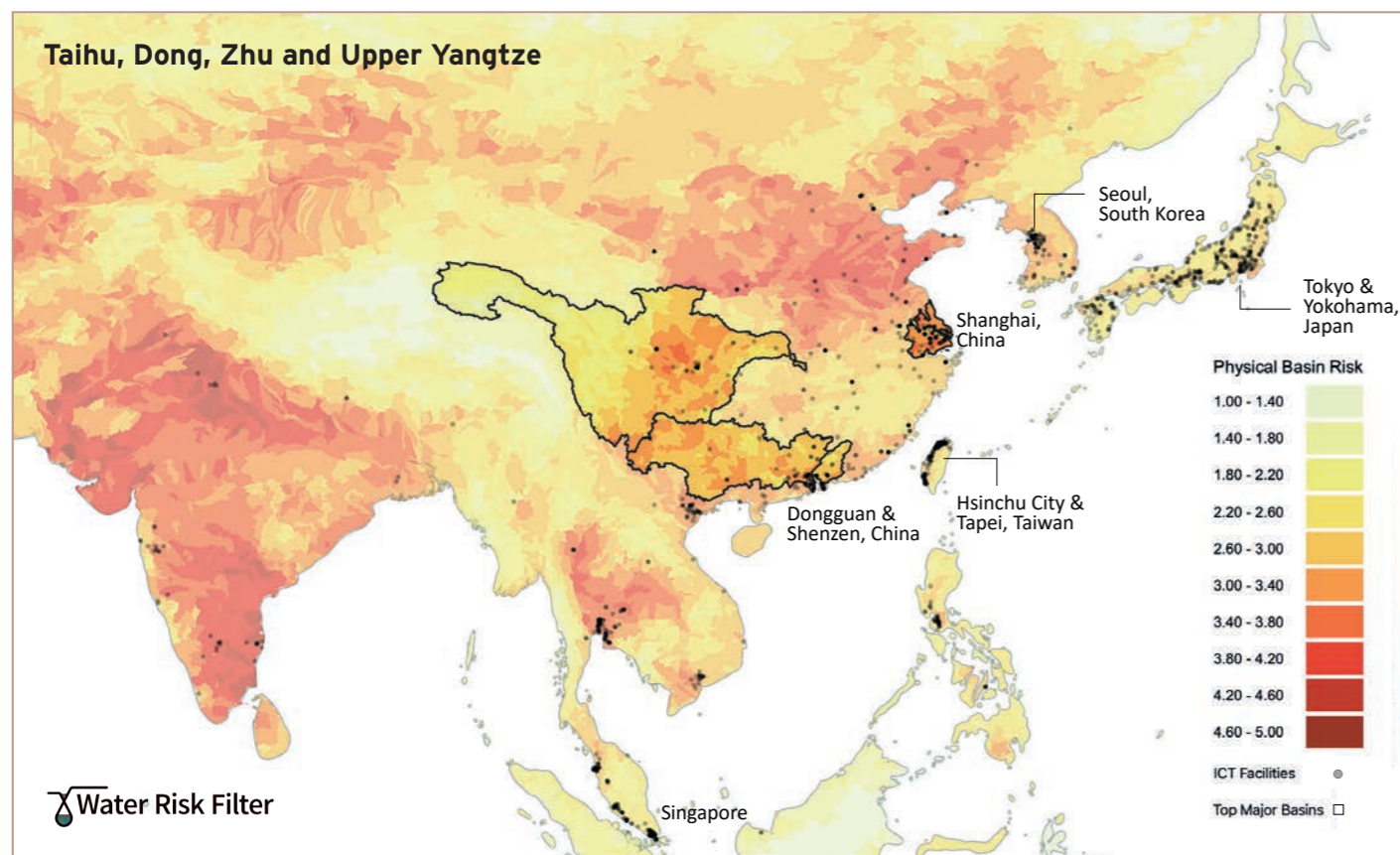


Figure 4: Distribution of by over 3,300 supply chain facilities across Asia, against Overall Physical Basin risk (with some basins from Figure 3 highlighted)

**Business clusters in urban environments**

There is a correlation between the clustering of ICT supply chain facilities and large urban environments or cities across Asia, Europe, and the U.S (Figures 4 and 5). This is relevant as businesses located within cities often rely on the cities themselves to provide them with access to water. This means there are opportunities for collaboration between cities and the businesses located within them to find solutions to macro water-related challenges. Another observation, relating to locations in Asia, is that many clusters are located downstream in major basins and close to coastal regions (Figure 4), meaning that the external risk of flooding, most notably in several key deltas (for example, Chao Phraya, Mekong, Zhujiang/Pearl, Yangtze-Taihu, Han) is significantly elevated.

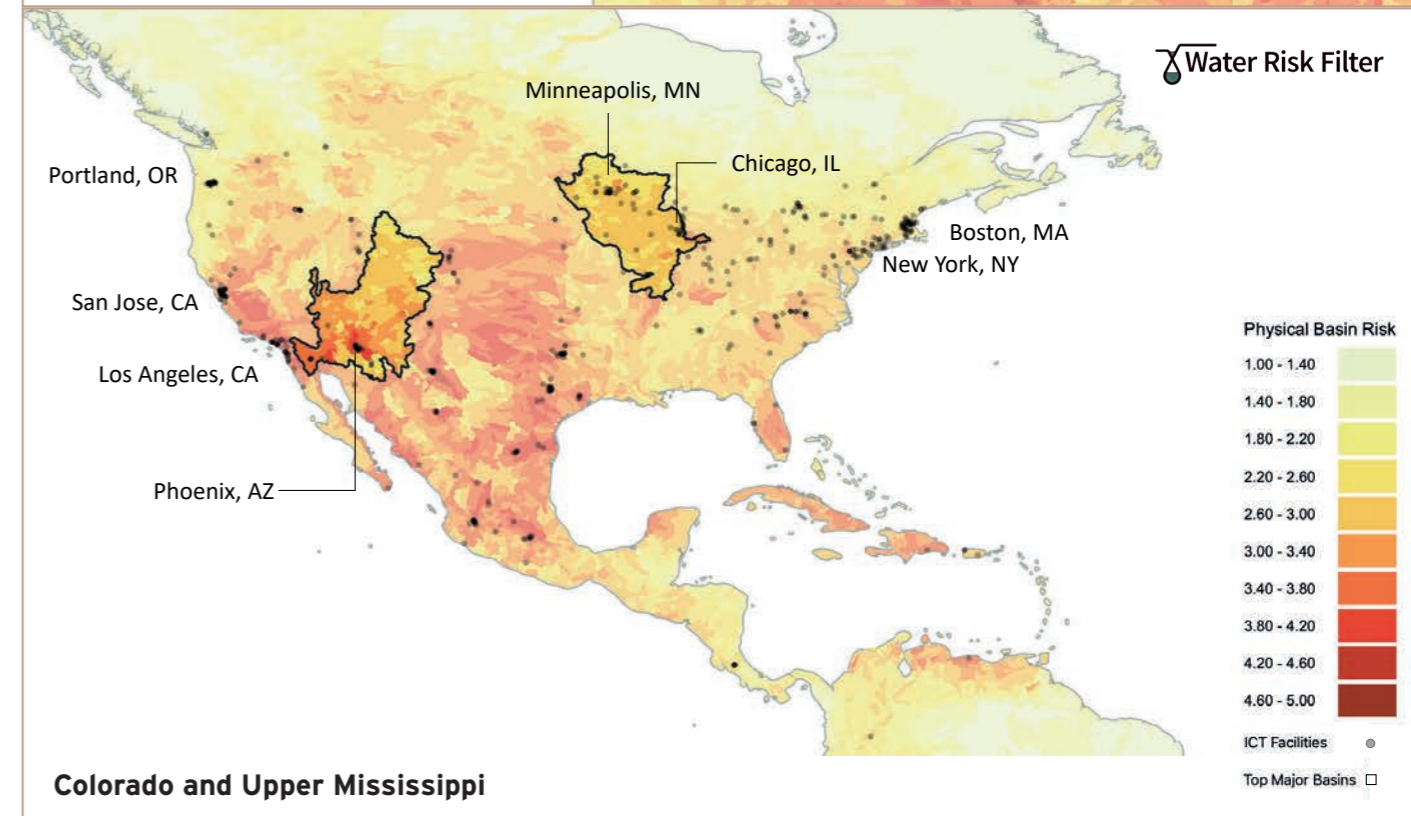
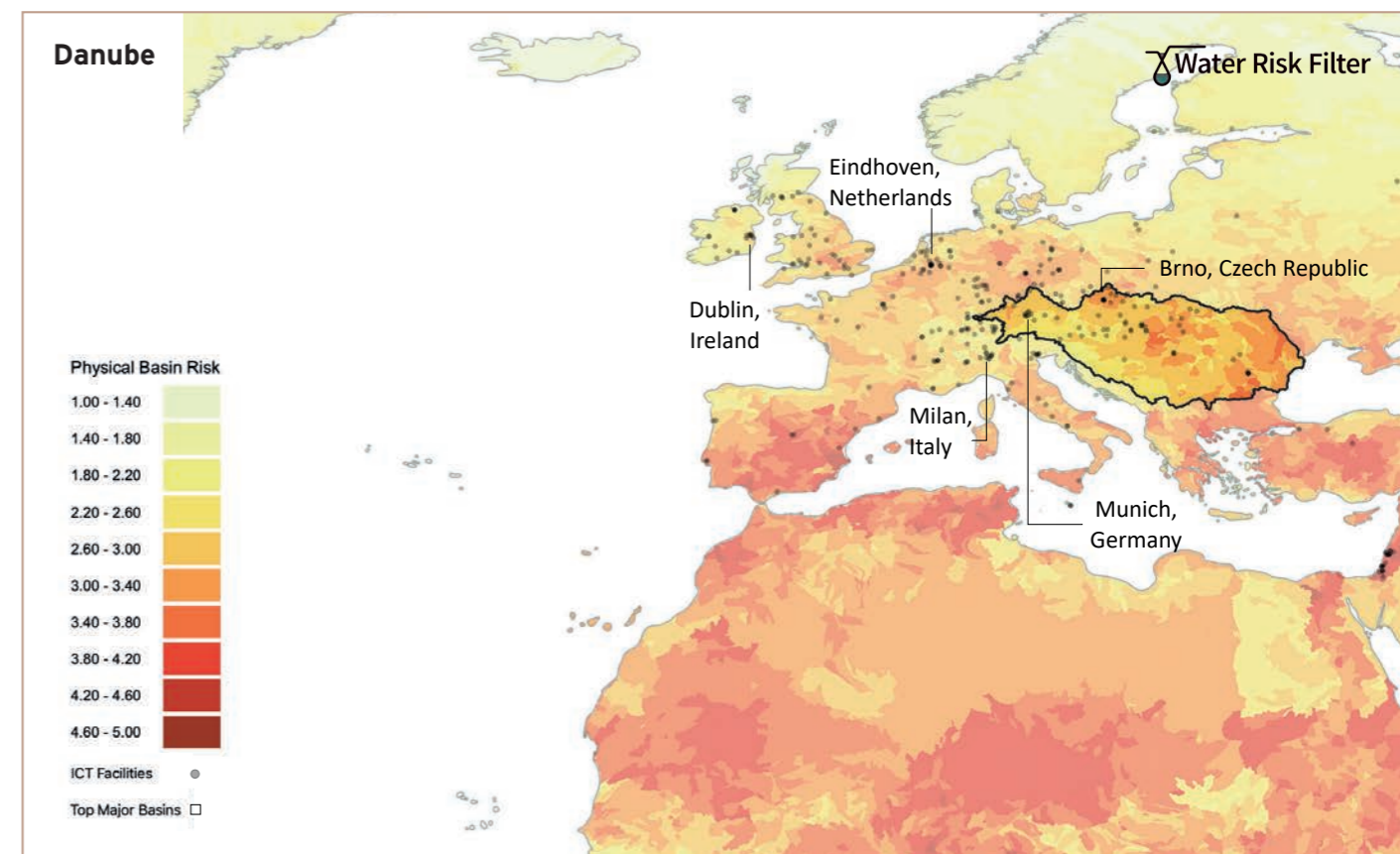


Figure 5: Distribution of over 3,300 supply chain facilities across the U.S and Europe, against Overall Physical Basin risk (with some basins from Figure 3 highlighted)



# The ICT sector's exposure to external water-related challenges is likely to be influenced by:

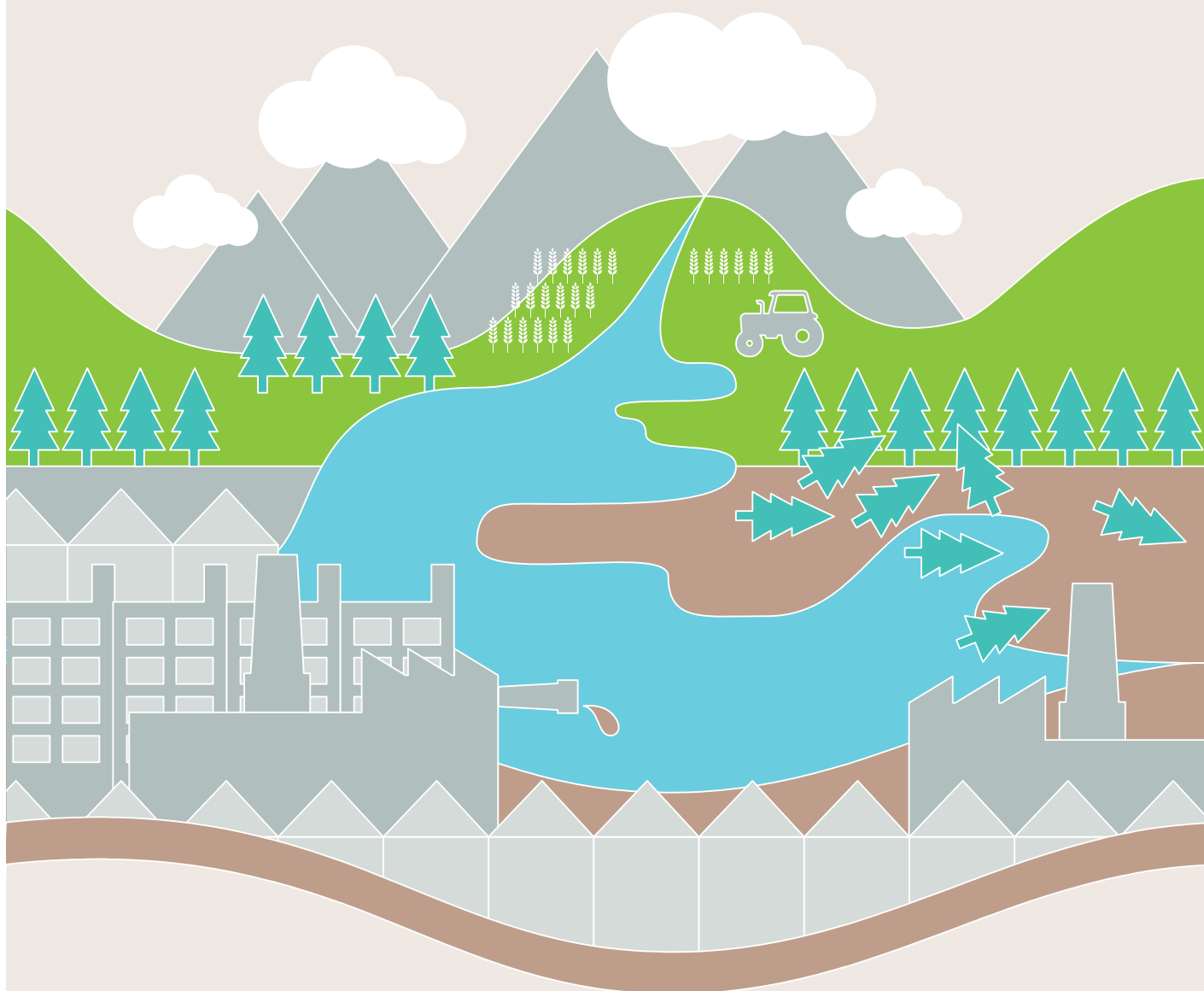
- **UPPER BASIN CHALLENGES**

For example, agriculture and deforestation

and

- **LOCAL URBAN TRENDS LINKED TO WATER QUALITY**

For example, sewage treatment infrastructure and flooding due to non-permeable surfaces, water infrastructure maintenance and planning issues.



Rapid urbanization will elevate competition for water within urban environments, but also between urban and rural environments. For example, the adequate supply of clean, useable water needed for urban environments will be reliant on upstream activities. Similarly, urban environments already exposed to flooding risks (and located in downstream coastal regions) will also increasingly be reliant on upstream infrastructure, especially nature-based solutions, in mitigating the impacts of both seasonal and extreme flooding events.



## Key messages

Part 1 explored where water touches on the ICT supply chain and what water-related risks and impacts might look like in different locations.

### In summary:

- Water risks exist throughout the supply chain, but they manifest in very different ways.
- The unique water-related impacts and dependencies of individual businesses within the sector are a direct function of how and where it operates, where it sits within a supply chain and the products/services that it produces.
- Overall, the ICT sector faces Very High or High Physical water risk, particularly in relation to flooding, water quality and degradation of ecosystem services in certain basins.
- Reputational Risk is also a significant concern for the sector, with circa 66% of sites facing Very High or High risks in this category.
- Whilst the largest supplier clusters are shown to be in Asia (Taihu, Dong, Zhu), there are also important clusters in Europe and North America with water-related risks.
- Many supplier clusters are found in cities, which face a wide array of water-related challenges, presenting an opportunity for collaboration beyond the ICT sector.
- Often, clusters are situated 'downstream' in the basin, leaving suppliers exposed to risk from the activities of other water users 'upstream', demonstrating the need for collaboration to solve shared water challenges.

Growing demand for technology means that the sector has the potential to have a significantly larger impact and dependency on water in the future. Acknowledging this, and taking bold action, has the potential to catalyse and enable innovation that addresses sector-specific water challenges but also for the sector to enable others to address water-related challenges, especially in urban environments that are strategic to the ICT sector.

## Cross-sectoral learning: water stewardship in apparel & textiles

The textiles and apparel sector has many similarities to the ICT sector, including the distribution of water-related impacts across the supply chain. Additionally, like the ICT sector, it also shares similar geographic contexts and has a high degree of urban clustering.

The sector has also been active in embedding water stewardship and various collective initiatives have results from this. Two are the Roadmap to Zero programme by ZDHC (aimed at reducing the sector's use of chemicals) and the Higg Index by the Sustainable Apparel Coalition (aimed at providing a suite of tools that enable businesses to standardize how impacts are measured and managed across the sector).



# THE CASE FOR WATER STEWARDSHIP

## What is water stewardship?

All businesses benefit from water in some form, whether to meet the sanitation and hygiene needs of employees, or as a raw material within operational processes. The ability for a business to access these benefits is reliant on the state of water resources immediately surrounding it, or its external context. This external context is informed by the physical state of water (the quality and availability of water) and the state of the governance and infrastructure used to manage it. As such, this context, along with a business' dependence on water, imposes a degree of risk to a business in its ability to access the benefit of water. Implementing internal management responses (for example, installing pre-operational quality treatment to mitigate exposure to elevated levels of external pollutants) can mitigate, to a point,

some of these contextual risks. However, many contextual risks are simply too complex for an individual business to solve alone.

Adopting water stewardship involves acknowledging that accessing the benefits from water involves a responsibility to preserve benefits for others. It also involves acknowledging that the responsibility to solve certain complex shared water challenges extends beyond the capacity of any individual actor and often requires a collective response in which the business has a role to play. These concepts are encapsulated within the AWS definition of water stewardship, which is: *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.*

Up until now, risk mitigation has been the primary entry point for organizations beginning a water stewardship journey. Risk language and framing is well understood within business culture and it provides a useful and 'comfortable' framing to connect the external (basin) and internal (operational) context of water. A narrow risk-based framing can support the business case for mitigating risks and leveraging opportunities (for example, water-energy-chemical cost savings) through more traditional water management practices. However, adopting water stewardship creates the foundations needed for the cost/benefit analysis for engaging in collaborative projects with others that offer greater returns with respect to water risk mitigation and capitalize on company specific water-related opportunities.



## Addressing water risk in the ICT sector through water stewardship

The degree to which a business is exposed to local water-related risks is a function of:

- the external context, and
- the operational dependence on water.

This means that, to accurately assess water risk exposure, a business must assess both its external (basin) and internal (operational) context together. Part 1 of this report explored the external (basin) risk facing a range of ICT facilities from across the supply chain. However, for a company to have a clear view of its own water-related risks, it needs to combine an understanding of the external context with each site's operational dependence on water.

Responding to water risk can take many forms with the most common being mitigation. Mitigation is primarily a management-type response as it is often focused on adjusting internal processes or systems to reduce exposure to risks. However, there comes a point when there is no business case for further mitigation responses – especially for complex shared water challenges. Here is where water

stewardship can enable the creation of business cases that more meaningfully connect business responses to broader systemic value, setting the stage for other forms of risk responses (for example, avoidance, transferring and sharing) that create greater value.

For example, in Part 1 we learnt that the ICT sector typically faces very high levels of risk from flooding and water quality issues. Whilst a site (factory) might put in place flood defenses or install their own water treatment processes in response to these risks, we now know that these actions are unlikely to fully mitigate the aspects of these types of risk that are driven by the external context. Given that many ICT supplier clusters are located downstream in the basin, it is likely that water users upstream will also contribute to the likelihood of the supplier experiencing flooding or water quality challenges. So, to address the flooding and/or water quality issues the supplier is facing, they need to not only mitigate their operational water risks, but also engage with other water users in the wider catchment (or watershed) to collectively solve shared water challenges. This is water stewardship.

## Creating opportunity and value through water stewardship

The business case for investment in reducing impacts and dependencies on water is often contingent on realized operational savings or reduced operational exposure to water-related challenges. However, there comes a point when the savings from these management type responses fail to exceed the required investment. A common cause of this is that water is often undervalued, with its 'value' reduced to a narrow set of cost variables (for example, price). While simple to quantify, this approach makes it harder to create a compelling business case. Water stewardship helps to establish the foundations for expanding the framing of 'value' within a business case making it easier to create compelling business cases for broader outside-the-fence water stewardship responses. Broadening the framing of the value of water supports businesses in identifying and pursuing new opportunities that could help to materially reduce impacts and dependencies on water while contributing towards wider systemic value.

### Key messages

Part 2 explored the concept of water stewardship as the necessary response to water risk in the ICT sector, as an evolution from traditional management approaches to material risks.

#### In summary:

- **Individual businesses do not have the capacity to respond to complex shared water challenges on their own.**
- **Water risks are highly localized, so businesses need to understand their external context as well as their operational dependence on water.**
- **Water stewardship is an approach that enables a business to develop a deeper understanding of its unique water-related impacts and dependencies within its local context.**
- **Water is under-valued, so a more holistic view of value-at-risk is required to effectively make the case for action through effective identification of opportunities.**

The information presented in Part 1 and Part 2 provides a sector-level view of the types of water risk an ICT company is likely to face and explains why a highly localized response is required to solve complex water challenges. Companies wishing to take the next step on water should map the company's owned operations and supply chain and use this to undertake a company-specific water risk assessment that includes both external context and operational dependency on water. This additional level of detail will allow the company to identify its priority locations for action and define a context-driven strategy for action on water, based on the level of risk exposure and the potential financial value each location holds for the business in terms of supply chain continuity and business resilience.



## PART 3:

# OPPORTUNITIES AND NEXT STEPS

This final section of the report presents steps for individual businesses to take to start their water stewardship journey, followed by opportunities for the ICT sector to collectively advance stewardship through collaboration.

### Starting a water stewardship journey

Making the shift from traditional water management to water stewardship can be daunting. Water stewardship re-frames the responsibility that a business assumes with respect to how water is used within its operations, but also establishes a more compelling case for reducing impacts and dependencies. The principles of stewardship are emerging not just as good practice within the water space, but also within corporate sustainability in general. This means that the concept is becoming more widely understood by the c-suite, but it may still be beneficial to treat any motivation for a shift towards water stewardship as an exercise in internal change management, as much as just an exercise in sustainability.

### To get started, businesses in the ICT sector are encouraged to:

- **Assess for impacts and dependencies:**  
Quantify impacts and dependencies on water across the supply chain using techniques such as water footprinting or Life Cycle Assessments to help establish a directional focus for water stewardship within the business.
- **Understand external water context:**  
Complete a basin risk assessment to identify material external water-related risks. This can be used to motivate for further operational assessments for sites in risk 'hot spot' areas.
- **Understand internal water context:**  
Complete an operational risk assessment to identify the unique level of exposure that operational locations have in relation to the external water context.
- **Enable water stewardship within supply chain:** Encourage those in the supply chain to: (1) measure and report water use (quantity and quality) through common platforms, (2) understand the link between water, energy and chemical, (3) understand water context and risk exposure and (4) adopt and implement the AWS Standard.
- **Learn from others and collaborate:**  
Participate in dialogues with industry peers and water experts to share knowledge and good practices to accelerate learning and adoption of water stewardship.

'Assess for impacts...', 'Understand external water context' and 'Understand internal water context' helps ensure that the business is responding to water from an informed position, considering the highly contextual nature of water and the range of water-related challenges and opportunities that might exist across operations and supply chains.

'Enable water stewardship within the supply chain' and 'Learn from others and collaborate' recognize that ICT supply chains (and therefore water risks) are interconnected and dependent on the activities of others when it comes to responding to water.

It is important to note that many of the activities within these steps are ongoing, as stewardship is based on the premise of continual improvement. Every company is at a different stage in their journey, with different capacity and resources to dedicate to water. As a result, collaboration within the ICT sector and more broadly across the water stewardship community is vital to capitalize on the benefits that can be created throughout ICT supply chains through good water stewardship.



## Opportunities for sectoral collaboration

The ICT sector is highly interconnected, especially deeper within the supply chain – meaning many brands share suppliers. This presents a significant opportunity for the sector to rapidly advance water stewardship throughout the supply chain through collaboration. By establishing a common approach to accounting for and communicating water-related impacts and dependencies across the supply chain, the ICT sector is better able to identify areas of opportunities to both individually and collectively address its water-related impacts and dependencies.

Strong sectoral collaboration will also help the sector respond to the growing demand for technology in a sustainable manner. As the sector continues to grow and innovate, there is the potential for it to develop a disproportionately large impact and dependency on water, yet ICT also offers enormous potential for enabling solutions to address complex shared water challenges. Meeting this growing demand for technology, while reducing impacts and dependencies, cannot be achieved only through traditional management and efficiency responses. It requires understanding throughout the supply chain, which in turn amplifies the need for collaboration.

A focused sectoral push to evolve the framing of water beyond existing good management practices into water stewardship begins to set the stage for wider sectoral collaboration on water. A common language for water across the ICT sector will enable all actors in the value chain to work together to find solutions to both current and future water-related challenges.

### Possible areas of sectoral collaboration on water stewardship could include activities which reduce the burden on suppliers, particularly SMEs, and enable them to take action, such as:

- Aligning as an industry via a shared understanding of how water impacts the ICT sector.
- Using a common approach to water stewardship to build capacity to respond throughout the supply chain.
- Creating a suite of common metrics to improve efficiency of reporting, particularly in the supply chain.
- Identifying shared water risk hot spots and responding collectively through water stewardship training and engagement programmes in those locations, providing benefit to the sector and other water users in the basin.
- Incentivising adoption of water stewardship through procurement practices.
- Embedding water stewardship as a fundamental aspect of sustainability through industry initiatives and platforms.

### There are also potential opportunities that exist through action beyond the ICT supply chain, including:

- Learning from other sectors who also face complex water challenges through interconnected supply chains, such as the textiles and apparel sector.
- Collectively designing out water impacts and dependencies across the sector, creating additional benefit through reduced water impacts in sectors that rely on ICT for their own activities.
- Using ICT innovation to find solutions to complex water challenges that impact society and other industry sectors.

All the suggested activities listed will help create positive momentum on water stewardship across the ICT sector. Some actions will be relatively easy for the sector to take, supported by industry bodies and water stewardship experts. Others will take longer, be more complicated to achieve, and will require engagement beyond the ICT sector. However, these complex actions are likely to create the biggest impact in terms of reducing water risk and creating value for the ICT sector into the future.

# ADDITIONAL INFORMATION:

## AWS

**AWS is a global multi-stakeholder alliance comprised of members from civil society, the public sector and the private sector. The AWS mission is to ignite and nurture global and local leadership in credible water stewardship that recognizes and secures the social, cultural, environmental and economic value of freshwater.**

AWS and its members are the custodians of the AWS Standard, which provides a multi-stakeholder developed and endorsed best-practice framework for businesses to implement water stewardship at their own sites and leverage action at their supplier sites. The Standard can be used by any water user, anywhere in the world. It takes the user on a journey to assess and understand their site and catchment water risks, set contextually appropriate targets, develop a

water stewardship plan, and then evaluate and communicate transparently about activities undertaken. Through independent verification, certification against the AWS Standard allows a site to make credible claims related to their water stewardship activities.

The AWS Standard provides a mechanism through which sites from any part of the supply chain can follow a defined approach to assess and understand both the external and internal water context and its material water risks. These site-level insights can then be aggregated to identify the material corporate-level water-related risks. The five steps of the Standard enable the implementer to understand their site's reliance upon, and impact on water resources, but crucially, it also steers the site through a process to identify other risks and opportunities that might exist outside the site itself, within the wider catchment (or watershed) and in its supply chain. It is through this comprehensive

approach moving beyond water management to stewardship that implementers contribute towards the five AWS outcomes.

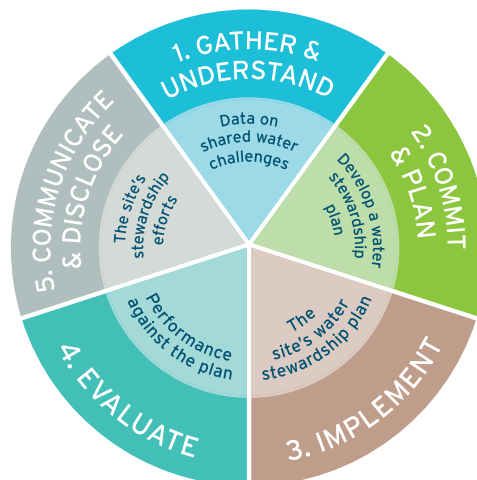
For the ICT sector, AWS could be used as a common language throughout the supply chain, reducing competing demands on suppliers and defining an agreed approach to responding to water challenges across the sector. Implementation of the AWS Standard by supplier sites will help inform target and strategy development for brands and suppliers alike, as AWS implementation takes a site through a process of data collection to understand operational and external risk, before embarking on engagement with local stakeholders and development of a water stewardship plan. In the ICT sector, significant value could be created by embedding globally recognized best practice water stewardship within existing sustainability-focused initiatives, and by rolling out an aligned approach in the supply chain.

## AN ACCESSIBLE 'HOW TO' FRAMEWORK FOR SITES TO IMPLEMENT WATER STEWARDSHIP

THE AWS STANDARD FRAMEWORK IS BUILT AROUND FIVE STEPS:

1. GATHER AND UNDERSTAND
2. COMMIT AND PLAN
3. IMPLEMENT
4. EVALUATE
5. COMMUNICATE AND DISCLOSE

Download the  
AWS Standard V2.0  
at [a4ws.org](http://a4ws.org)



THE STANDARD IS INTENDED TO ACHIEVE FIVE MAIN OUTCOMES:

- GOOD WATER GOVERNANCE
- SUSTAINABLE WATER BALANCE
- GOOD WATER QUALITY STATUS
- IMPORTANT WATER-RELATED AREAS
- SAFE WATER, SANITATION AND HYGIENE FOR ALL (WASH)

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