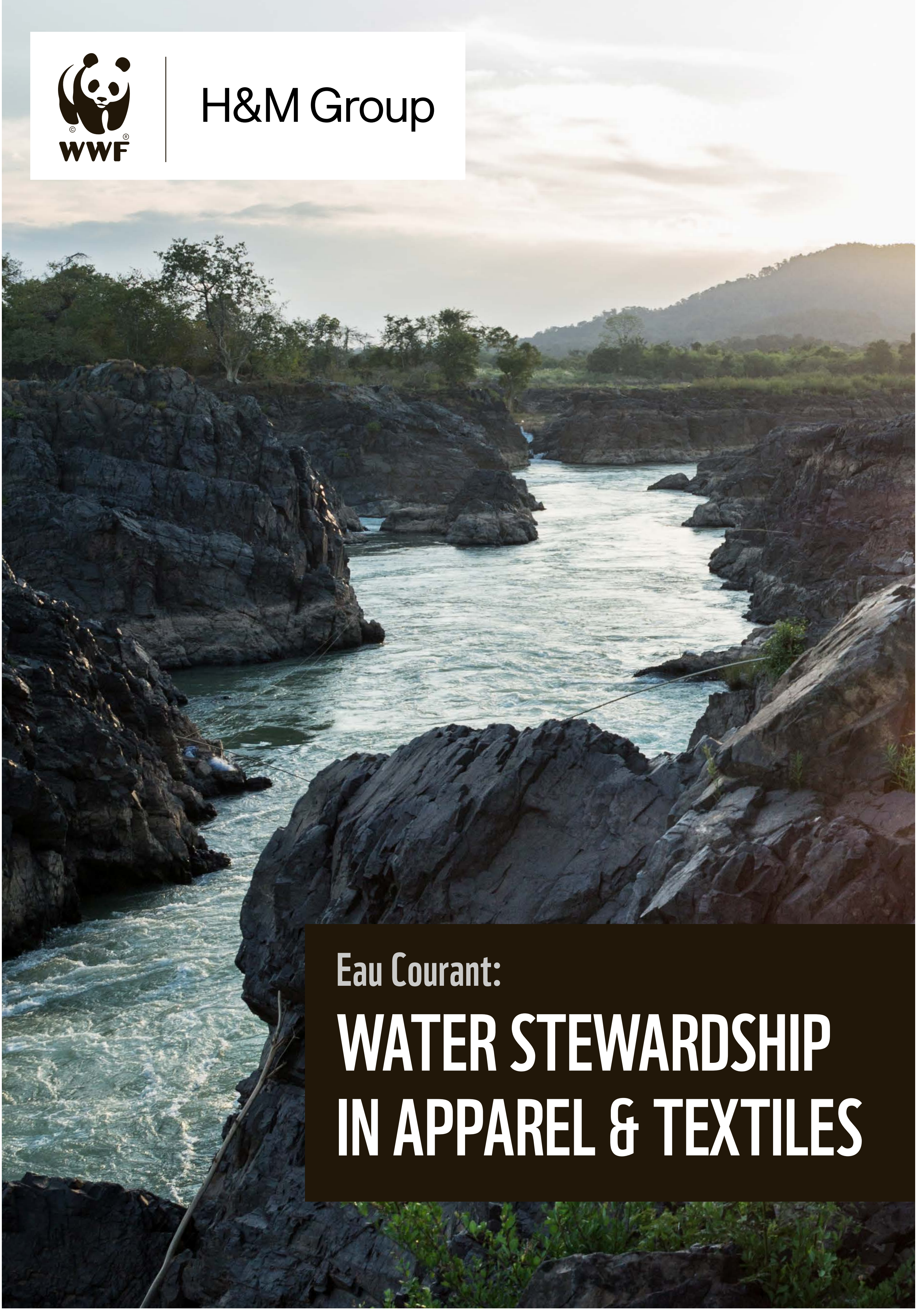

WWF

H&M Group

Eau Courant:

WATER STEWARDSHIP IN APPAREL & TEXTILES

PART I: WATER AND THE INDUSTRY'S VALUE CHAIN

3 PART REPORT

Part I (this report) explores the touchpoints of water along the industry's value chain, while Part II unpacks water risk and opportunity for key apparel clusters. Lastly, in Part III, we lay out WWF's vision on water and our water stewardship program within the apparel and textiles sector.

Report 2 is scheduled to be released Fall 2022. Read more on wwf.se/hm

Content

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FOREWORD BY H&M GROUP

I started my career at H&M Group as an environment manager in Bangladesh. Over the years, I have seen a real change in attitudes towards water in the apparel and textile sector. Apathy and a lack of understanding has been replaced by readiness, a desire to change and action.

For fashion brands the starting point has to be understanding how your business and its activities impact water. We first mapped the impact of our supply chain back in 2012. This gave us valuable insights into the water issues we faced on a local, regional and global level, which allowed us to identify and prioritise our actions.

To date, we have mapped water intensive processes in tiers one and two of our supply chain, but we know that our business has wider-reaching impacts. We are currently working with WWF to explore how we can analyse the full value chain, including fibre production and the customer use phase. We welcome this report and believe it will help our industry gain a better appreciation of the breadth and depth of its impact.

However, understanding is just the first step. Action must follow. In the early years of our water work, we focused on reducing water consumption and improving discharge water quality. We also encouraged our supply chain partners to join cleaner production programs like IFC-Textile PaCT and Sweden Textile Water Initiative. While these initiatives improved how we used water in the supply chain, they did not go far enough. Outside of our supply chain, basins were still deteriorating.

Water issues are extremely complex. As Prof. Dr. Eddy Moors said in his inaugural speech as rector at IHE Delft Institute for Water Education, “water is a wicked problem”. But as with all problems, there are also opportunities. For example, collaboration and co-creation with external organisations and stakeholders, such as other industries who operate in the same basins, competitors who share suppliers or the communities that live nearby.

Adopting a water stewardship approach has moved us to act beyond our supply chain. It’s helped us to see water through the eyes of others and appreciate its true value. In addition, we’ve discovered innovative solutions that we could never have created alone. On top of working with external partners, we are also making changes to how we tackle water issues within our own operations, right from the design stage through to how we reuse and recycle products.

We hope that this series of reports will raise the importance of water in wider dialogues. It’s a conundrum that despite the IPCC’s repeated warnings that water related disasters such as erratic rainfall, drought and flooding are the result of climate change, the focus on reducing carbon emissions often upstages other crucial areas such as water. We can’t expect to reach net-zero without considering water, and this requires joint efforts and cooperation.

No matter what your size or experience, these reports from WWF will build your understanding and help you get started. At H&M Group, we call our work on water ‘a journey’ and invite everybody to join us.

Sharif Hoque
Impact Lead – Water
H&M Group

“No matter what your size or experience, these reports from WWF will build your understanding and help you get started. At H&M Group, we call our work on water ‘a journey’ and invite everybody to join us.”

INTRODUCTION

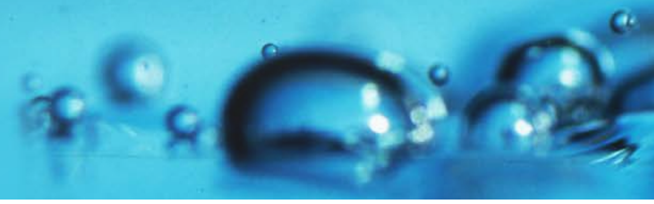
The apparel, footwear, and textiles industry (the industry for short) has made some headway on sustainability in the past few years, stepping up target setting and collaboration around chemicals, climate, supply chain reporting and driving toward more sustainable materials. Nevertheless, one major impact area still remains relatively neglected by the industry: water.

> **"THERE IS NO BEAUTY IN THE FINEST CLOTH IF IT MAKES HUNGER AND UNHAPPINESS."**
>
> **Mahatma Gandhi**

WWF believes that now is the time for the apparel and textiles industry to step up and embrace its vital role in transforming the water management and governance in many of the key production regions – many of which are located in some of the world's highest water risk regions, such as South-East Asia.

From the outset, it is important to note that WWF recognizes that there are indeed good efforts underway on water. Industry initiatives like the Sustainable Apparel Coalition (SAC), Zero Discharge of Hazardous Chemicals (ZDHC), the CEO Water Mandate, and Textile Exchange (TE) all have strong content related to water management – for example, SAC's Higg Index Facility Environment Module's questions on water management are helping to create an industry-wide water reporting for factories, while ZDHC's focus on eliminating toxic chemicals from supply chains means that the industry possesses a de-facto wastewater standard for dye-houses and other high impact sites. Similarly, the industry is showing signs of recognizing the key role of its value chain as evidenced in the rise of the Open Apparel Registry (OAR). However, it is our belief that these activities still only scratch the surface of the industry's full impact and dependence on water globally. Indeed, perhaps the best example of the blindspot on water comes through its current absence in the G7 Fashion Pact, which currently only focuses on climate, biodiversity, and oceans, with water being conspicuously absent to date.[1]

WWF works extensively with many apparel and textile brands. Our efforts with many of the industry's more sustainable brands, have continued to evolve over the years, working to measure and reduce water use and wastewater impacts with brand's tier 1 and tier 2 suppliers, along with select commitments related to various fibre sourcing. This is a good starting point, but there are two issues to note: (1) these companies represent many of the leading actors, not the mainstream, and (2) even with leaders, there remains a need to push



further into the value chain, into mills not yet mapped by companies, into outsourced wet processing and laundry units, and, in particular more deeply into the specific locations of raw material sourcing. Moreover, the apparel and textiles industry has only just begun to take on board many of the complexities of water: its multi-aspect, local, contextual, seasonal, time-bound nature. Very few companies have a strong understanding of the wider hydrological landscape and the roles of other water users, regulators and the environment in finding meaningful solutions. Likewise, the sector has yet to fully embrace how water, and the stories that it brings, can also be a source of opportunity, brand enhancement and revenue growth.

This report represents the first in a series of apparel and textile industry reports. Through these reports, WWF is seeking to harness industry data from the SAC Higg, the OAR Database and other sources, to analyse the industry's biggest impacts on water, the geographical sourcing regions facing the most risk around water, and lay out a long-term vision for how the apparel and textiles industry can transform itself and others through taking a water stewardship approach. Part I (this report) explores the touchpoints of water along the industry's value chain, while Part II unpacks water risk and opportunity for key apparel clusters. Lastly, in Part III, we lay out WWF's vision on water and our water stewardship program within the apparel and textiles sector.

It is our hope that these reports can further drive the industry forward to embrace water stewardship. The analysis and the resulting transformational vision aims not to critique, but to support companies and help them to join collective efforts in key production regions. Only by working together can we collectively tackle the shared water challenges that will ultimately benefit people, planet and business.

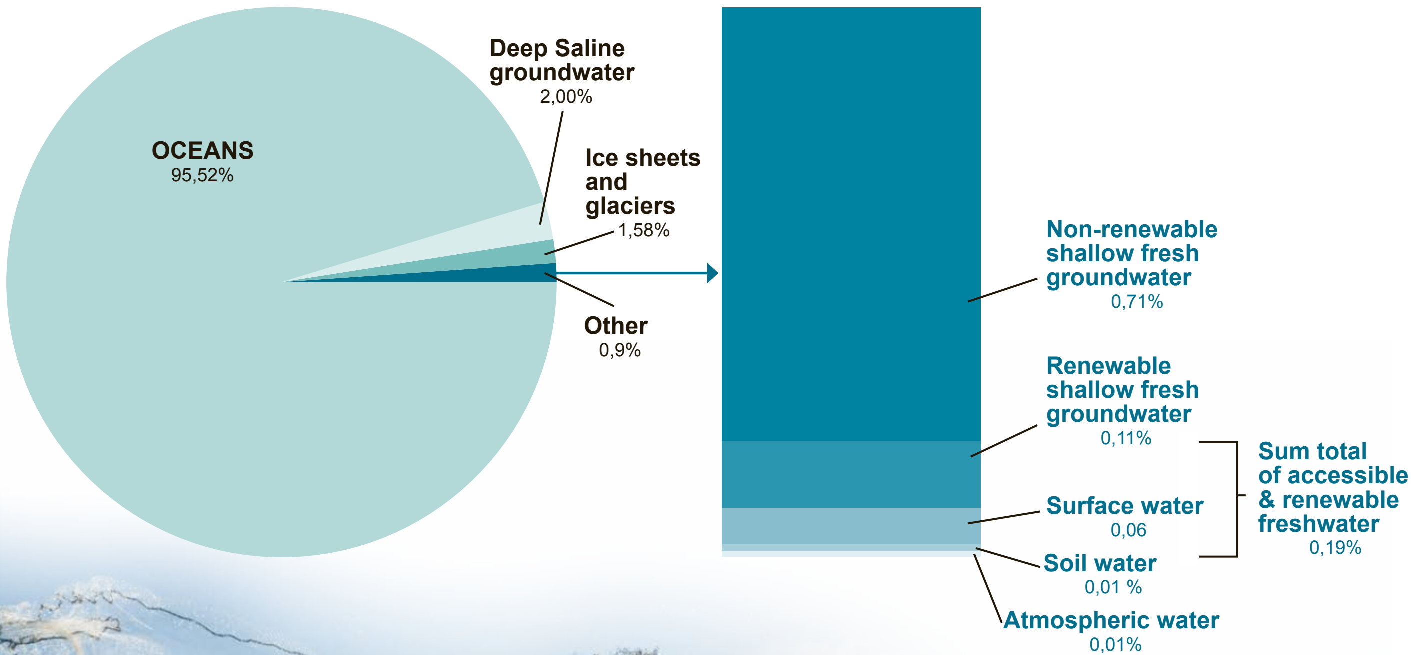
"Very few companies have a strong understanding of the wider hydrological landscape and the roles of other water users, regulators and the environment in finding meaningful solutions."

WHY DOES WATER MATTER?

Water is a social and economic good upon which all life depends. Water is also a shared resource, moving in a dynamic cycle through space and time that makes water difficult to control given its shared nature.

While the planet has abundant salt water, a mere 2.5% of the world's water is freshwater and of that, the vast majority is locked up in glaciers and deep groundwater, leaving a mere fractional percentage (0.19%) available for annual (renewable) use by humans and nature (Figure 1)[2]. Moreover, that global fraction is not equally distributed across the planet – with many places having very little water. With the world's water demand increasing, many basins now find themselves in a condition in which annual withdrawals are far beyond sustainable limits on/ of local water resources.

FIGURE 1: **Composition of Earth's accessible freshwater available for use by humans and nature**[3]



The nature of Earth's water cycle makes water both global and, at the same time, intensely local. Water used at a particular time and in a particular place from a specific source is not interchangeable with water in a different context in terms of the benefit it provides to humans or the ecosystem. This sits in stark contrast to GHG emissions which are not highly location-sensitive. Water operates within river basins, and all water users within these basins therefore impact each other through their water use behaviour. The 84% decline seen in freshwater biodiversity since 1970[4] is a clear sign that freshwater species are being put under unsustainable pressure from the redirection, re-allocation and pollution caused by humans. This pressure is only likely to increase in the face of climate change and increased agricultural needs due to population and standard of living growth.

Water has consistently been identified in the World Economic Forum's annual Global Risk Report as one of the most acute global risks facing us today, both in terms of likelihood and in terms of impact. Indeed, over the past decade, water has featured as one of the most likely and impactful risks facing our planet along with an array of other water-related topics such as climate change, biodiversity loss, extreme weather and natural/human made disasters.[5]

The reason that water is being regarded as such a large global economic risk is that water challenges are already causing profound social, economic and political consequences in many economies. From direct impacts on food availability and energy security, to issues of trade, the environment and human conflict, we are seeing nations increasingly search for ways to ensure their long term growth and sustainability of their economies which rely upon water as a factor of production.

Put simply: water is central to food, energy and manufacturing and when its quality, quantity and availability are impacted, there is the potential for major business impacts. Conversely, taking action to protect and restore the world's water resources and freshwater ecosystems will, by contrast, sustain the many social, cultural and economic benefits such ecosystems provide. Exactly how the apparel and textiles sector is exposed to these various water risks is the focus of Part II in this series on water risk in the industry.

Although water was not a priority for the apparel and textiles industry for a long time, we now see most leading companies in the industry with internal water strategies and public commitments around water quality to address these risks. Indeed, recent data from CDP suggests that 2020 may have been a tipping point for the sector[6] and we are hopeful that we will begin to see more companies linking their business strategies to water use and water stewardship.

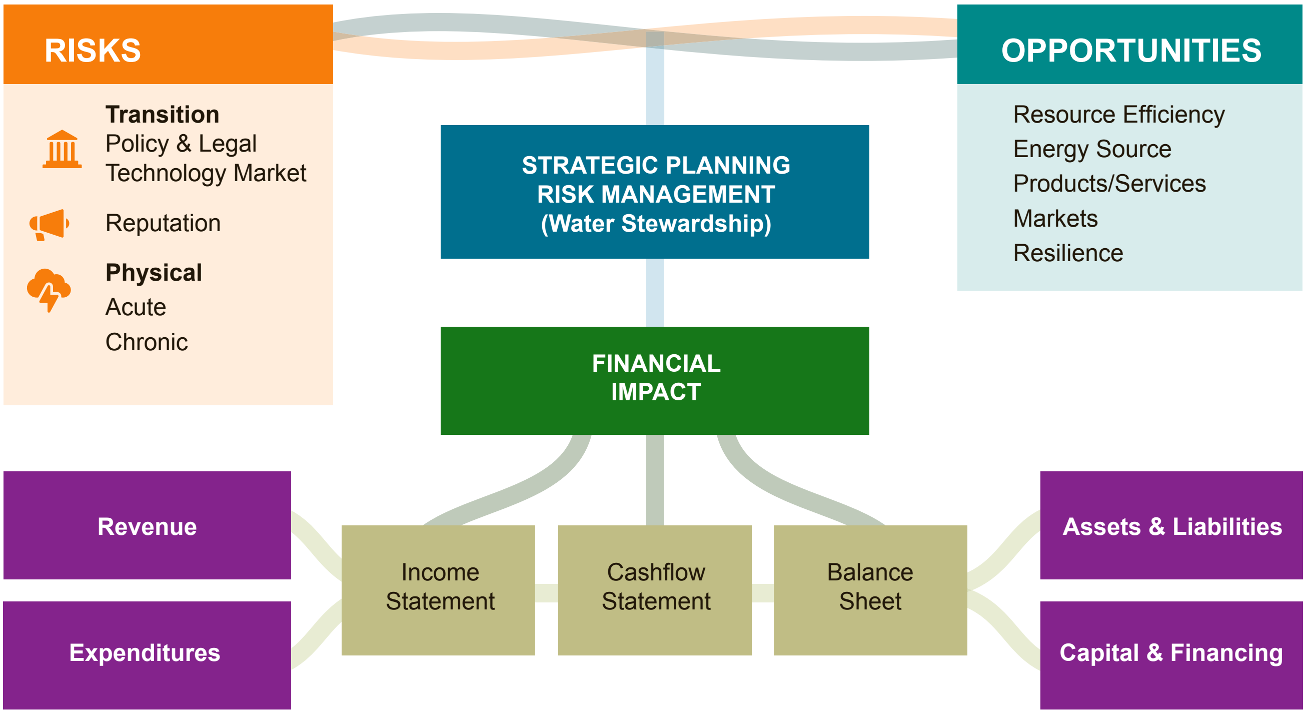
Key drivers for the rapidly increasing importance of water to the apparel and textiles industry include:

- **Apparel companies are starting to better understand the water risks and their financial impacts.** For example, rapidly declining groundwater levels in Bangladesh are already undermining the biggest industry in the country. Apparel companies are also becoming aware of climate change-related risks such as floods and droughts that will have significant impact, and the fact that most climate change related-disasters are linked to water, with climate change adaptation often involving water-related activities. This awareness is coming on the back of key stakeholders who are asking for more information, including the following bullet points.

"STYLE IS A SIMPLE WAY OF SAYING COMPLICATED THINGS."

Jean Cocteau

FIGURE 2: A view on how water stewardship lives in the interface between risk, opportunity, and financial impact.[8]



The TCFD framework is broadly aligned to water stewardship approaches. The framing of water risk differs slightly (as seen), and planning efforts are where most water stewardship efforts land, but broadly the thinking is very much aligned.

- **Consumers asking questions about sustainable supply chains.** In response to consumer demands, apparel companies are developing a stronger understanding of where their significant negative impacts lie in different parts of their supply chain, and increasingly taking shared responsibility to reduce that impact and drive more sustainable production.
- **Pressure from civil society and non-governmental organisations**. For example, Greenpeace's 'Dirty Laundry' campaign[7] in 2012 acted as a wake up call in the industry on water pollution challenges that led to the establishment of the ZDHC initiative.
- **Pressure from investors and financial institutions**. Investors are increasingly aware of the potential financial impacts from water-related risks with initiatives such as the Task-force for Climate-related Financial Disclosures. Also linked to this is the increasing importance of scoring well on water related issues in disclosure and benchmarking efforts, for example CDP Water Security Questionnaire, Dow Jones Sustainability Index or other ESG ratings.
- **Pressure from governments and water agencies.** Leadership at both national and sub-national levels will be driving change with stricter water policies, and companies want to get ahead of new regulations.
- **Employees that are becoming increasingly interested in working for companies that have a positive impact in the world.** Companies are realising that without a strong culture of sustainability they will not attract and retain top employees.

In addition to understanding what is driving pressure to face water risks, it is also important to understand how water risks can manifest as financial impacts. Figure 2, which is an adaptation of the Taskforce for Climate-related Financial Disclosures (TCFD) provides us with a view on how water stewardship lives in the interface between risk, opportunity and financial impact.

HOW ARE WATER AND FASHION CONNECTED?

Water may not be the first thing that customers think about when purchasing an item of clothing, a handbag, or an upholstered chair, but the apparel and textiles industry is linked to water across the entire value chain, from raw materials production to consumer garment and fabric care.

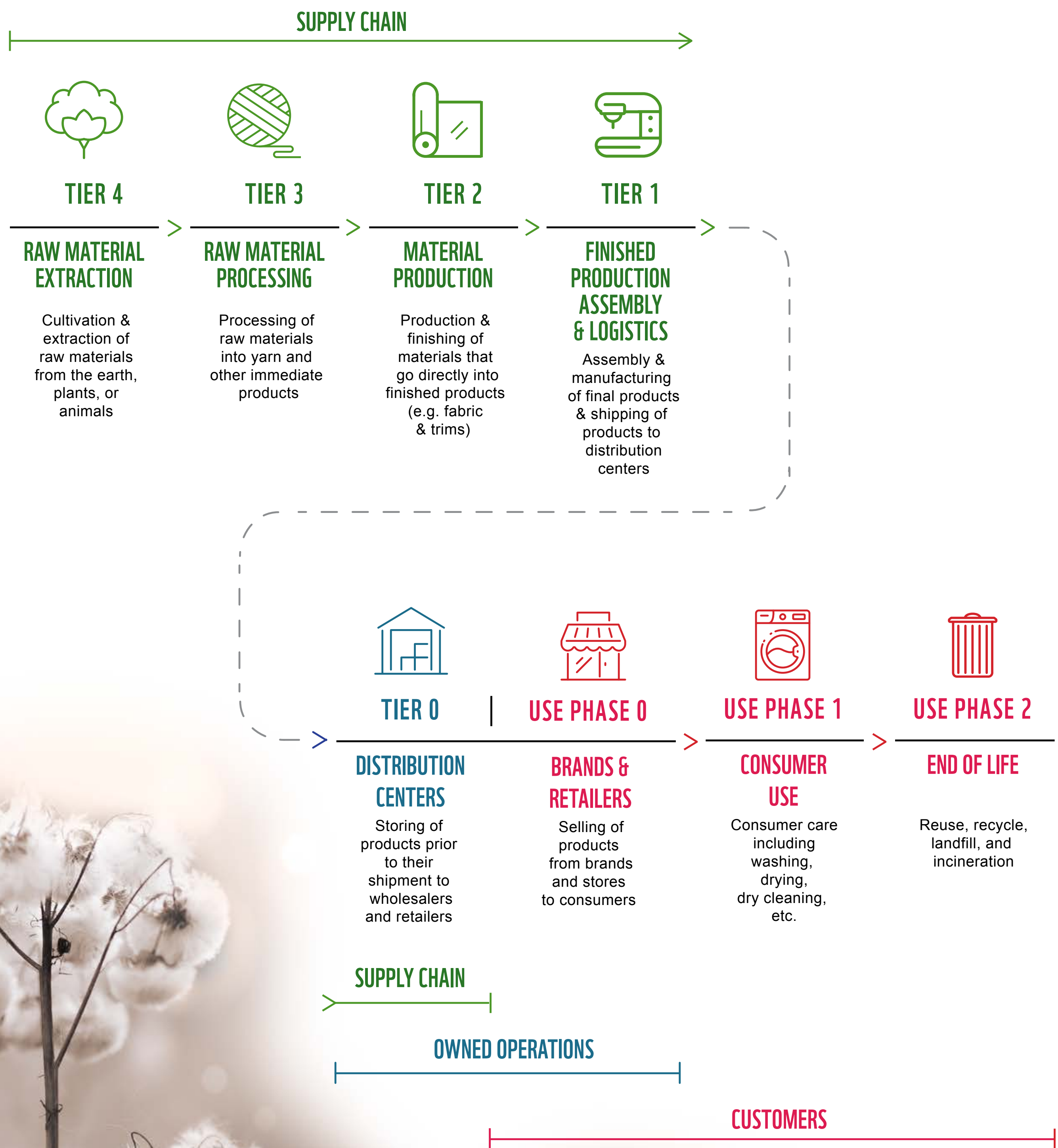
Water is used from the farm-level to grow cotton (and other natural fibres), all the way along the supply chain (e.g., to process fibres, to dye and finish products) right to the end when customers use water to wash finished items. Raw material production, leather tanning and wet processing often generate water pollution, and laundering of garments can release microfibres and other harmful substances into rivers and oceans. Typically, these steps of the value chain are broken down into stages called “tiers”. Figure 3 on the next page (page 12) shows each segment of the textile and apparel sector’s value chain, including supply chain, owned operations, and use phases by customers. It is critical to stress that each of these tiers and use phases within the value chain have not only some level of impact upon water systems, but are also dependent upon water systems.

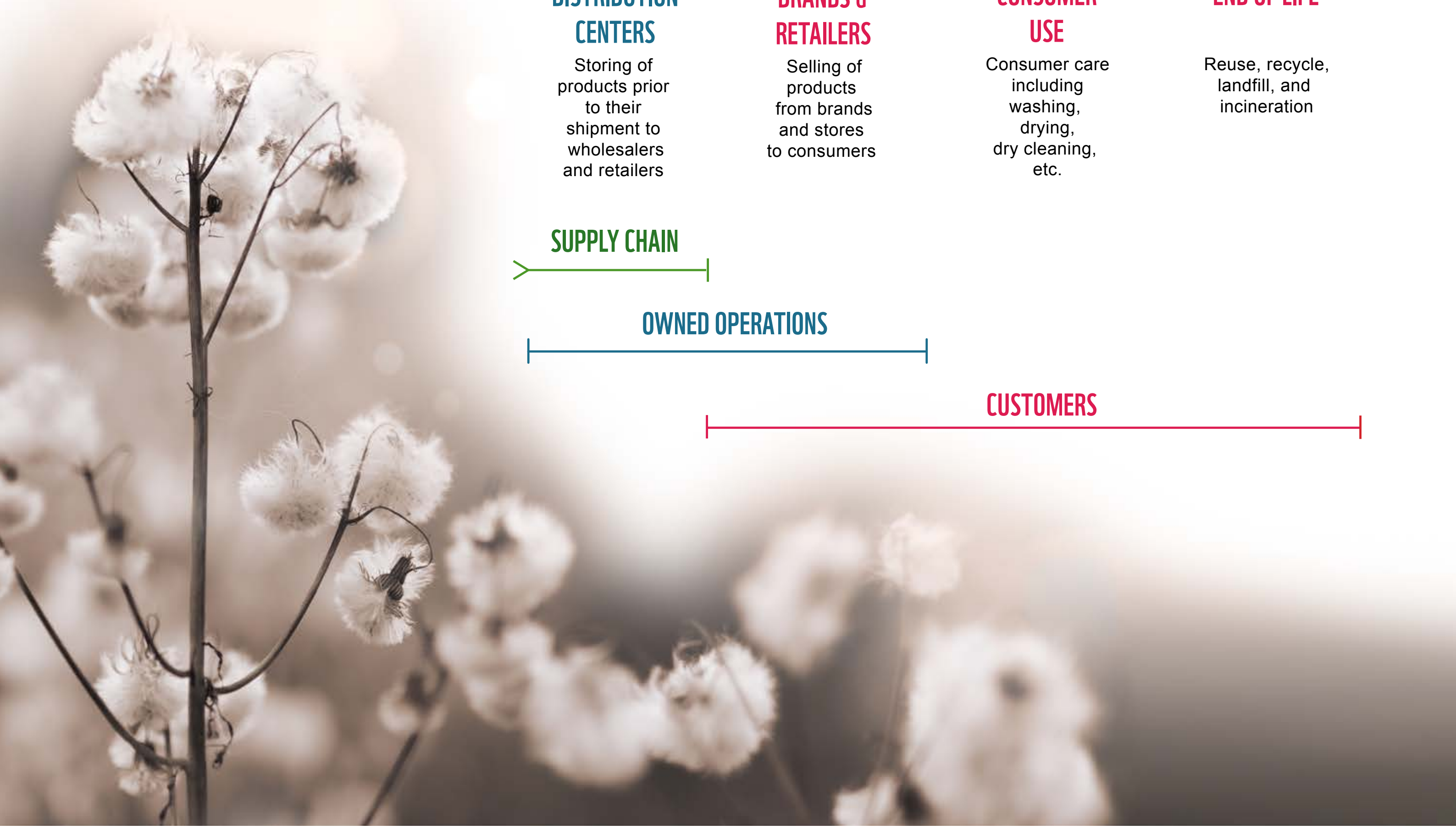
To fully understand how water and apparel and textiles are connected, it is vital to grasp the level of materiality of water impacts and dependencies in different parts of the value chain. These dependencies are a reminder to the sector that to address water means thinking about the broader river basins in which it operates.

“FASHION IS NOT SOMETHING THAT EXISTS IN DRESSES ONLY. FASHION IS IN THE SKY, IN THE STREET, FASHION HAS TO DO WITH IDEAS, THE WAY WE LIVE, WHAT IS HAPPENING.”

Coco Chanel

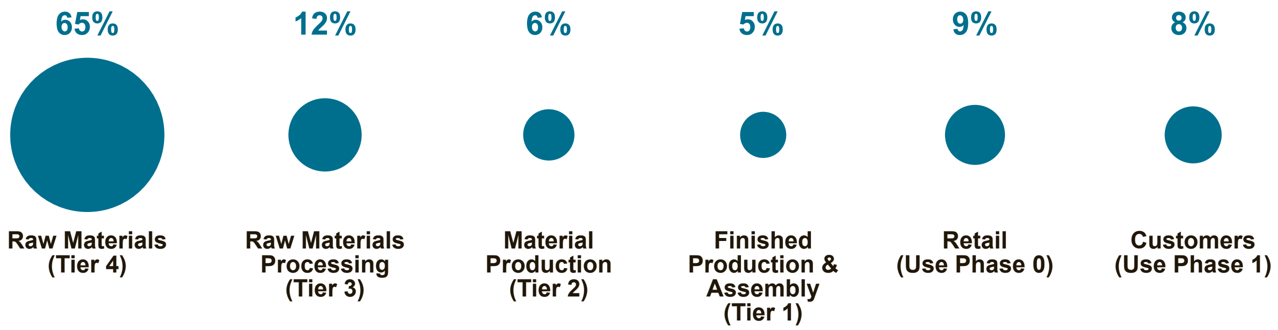
FIGURE 3: A linear breakdown of the value chain in the textiles & apparel sector.[9]





Analysis from Quantis in 2018 looked at the environmental impact of the global apparel industry across several categories, and found that the majority of freshwater withdrawal in the apparel industry originated from fibre production at 30% (including synthetics, cotton, cellulosic fibres and other natural fibres such as linen), and dyeing and finishing at 27%. Impacts on water quality are found to come from a mix of processes, notably dyeing and finishing (31%), yarn preparation (24%) and fibre production (26%).[10] WWF Analysis of LCA data for water use in the apparel sector also determined that the majority of consumptive water use is in the raw material production stage in Tier 4, noted in Figure 4 below.

FIGURE 4. Simplified summary of distribution by percentage of consumptive water use across different parts of the value chain. WWF analysis.[11]



Building on LCA evaluations across the value chain, one can conclude that:

1. **The sector is highly dependent** on clean and cheap water supplies across its value chain.
2. **Many of the biggest apparel sourcing regions** (such as China, Vietnam, Bangladesh, India, Pakistan and Turkey) are subject to significant water risks. These include risks related to shared water challenges around water availability, flooding, pollution or gaps in water regulation and planning. The impacts in these regions are only likely to grow in the face of population growth, increasing urbanisation and climate change (NB: This will be the focus of the second report in this series).
3. **Without addressing these water challenges**, the apparel sector is likely to face significant operational, reputational and financial impacts going forward.

All this means is that to continue operating in the future, the apparel and textiles industry will need to fundamentally address its relationship with water. This means not only tackling impacts deeper in the value chain, but also enhancing the industry's understanding of its dependency on water.

To more succinctly organise the different impact/dependency dimensions of water, we can use the following categories:

1. **Access to clean water, sanitation and hygiene (WASH)**

– Competitiveness in the textiles industry is often rooted in labour. Many of the apparel clusters we see (e.g., Dhaka, Shanghai, Ho Chi Minh, etc.) have their roots in an abundant supply of skilled, inexpensive labour. Yet these are the same workers who often face challenges when it comes to accessing clean water, adequate sanitation and training on proper hygiene (WASH). As a result, waterborne illnesses are prevalent in many of these same clusters, resulting not only in poor health of workers and/or their families, but potential lost working days ultimately leading to higher costs. More notably, the human right to water is just that: a human right and something that is fundamental as part of a safe working environment.
Key parts of the value chain:
Tier 4, Tier 3, Tier 2, Tier 1
UN Sustainable Development Goals:
6.1 and 6.2

"All this means is that to continue operating in the future, the apparel and textiles industry will need to fundamentally address its relationship with water."

2. **Water Quantity (Scarcity)** – The textiles industry withdraws and discharges high volumes of water for production processes like cotton growing, fabric dyeing, laundry and leather tanning often in regions where water is scarce.

When it comes to water quantity, it is critical to not only distinguish between withdrawals (the water that is taken out) and consumption (the water that is taken out and not put back), but also to account for context. In other words, are you taking water out of a basin that faces water scarcity or has abundant water resources? Are the groundwater resources you use being over extracted?

The context dictates the importance of the impact, and that includes where the apparel is used by customers. It is important to note that water quantity can have significant impacts on human health and ecosystem health (e.g., groundwater depletion, lower crop yields).
Key parts of the value chain:
Tier 4, Tier 2, Use Phase 1.
UN Sustainable Development Goals: **6.4**

“ It is important to note that water quantity can have significant impacts on human health and ecosystem health.”

3. **Water Quality** – As with volumes of water, the industry also has significant impacts on water quality. In particular, raw material production and wet processing both have major impacts on water quality, however fibre preparation and production can also have water quality impacts, as can customer use. Like water quantity, water quality impacts also merit considering context since some water bodies can absorb more (or less) pollution than others, and quality is invariably determined from cumulative impacts (i.e., have variable ambient water quality). However, unlike water quantity, water quality has multiple dimensions as water has chemical (e.g., oxygen, nitrogen, etc.) and physical (e.g., temperature) and biological dimensions (e.g., biological oxygen demand levels), making it arguably even more complex. *For a table of key water quality parameters and values at a safe level, see Appendix A.* Poor water quality impacts the health of workers, communities, and ecosystems (e.g., polluted water from textile dyeing can be toxic and potentially carcinogenic, which can lead to environmental degradation and cause disease in humans and animals).
Key parts of the value chain:
Tier 4, Tier 3, Tier 2, Use Phase 0, Use Phase 1, Use Phase 2.
UN Sustainable Development Goals: **6.3**

Are you taking water from a region that faces water scarcity or has abundant water resources? Are the groundwater resources you use being over extracted?

4. Water Governance – While WASH, quantity and quality are often recognized in the industry, water governance is often, and wrongfully, set aside. Water is fundamentally a shared, public resource and at its root, part of the reason we talk in terms of “stewardship” versus “management”; one never fully owns and controls water – we are merely taking it from upstream and handing it to others downstream. As a public resource, it is also shared, and contested. Fragmented water governance in many parts of the world ends up in abandonment or ignorance of any sort of water management in those areas.

How it is governed is therefore quite critical to how it is used at a local level, including by business. It is also worth noting that governance is not synonymous with government. Arrangements on how water is used amongst stakeholders may be managed through many different arrangements, but does often involve the government who sets the rules (laws & regulations), as well as enforces them (fines & penalties), and sometimes also enables key mechanisms for good water governance (data transparency, stakeholder platforms, etc.).

For the apparel industry, the sector itself has sought to tackle stronger governance through various platforms and initiatives that seek to establish pre-competitive collaboration on metrics, data, training and so forth. When water governance fails, it can create highly variable operating environments and also result in shared brand damage. Weak enforcement and a lack of information transparency can result in good actors being blamed for the impacts of poor actors.
Key parts of the value chain:
Tier 4, Tier 2
UN Sustainable Development Goals: **6.5**

5. Freshwater Ecosystems – Lastly, freshwater ecosystems are in many ways, the natural infrastructure that delivers clean water to everyone. When they begin to break down, as with climate change, it acts as a risk multiplier – floods get worse, droughts get worse, water quality decreases, and generally water risks worsen and biodiversity is negatively impacted. Conversely, when strengthened, nature can enhance resilience and mitigate climate and water impacts.

However, raw material sourcing and wet processing have significant impacts upon habitat loss and species health (as noted above under water quality) meaning the sector has both dependencies and impacts on ecosystems.

For the apparel sector, the importance of freshwater ecosystems also goes beyond just direct water risks: in many apparel clusters (notably Southeast Asia), freshwater ecosystems are key sources of protein through freshwater fisheries. These fisheries are key to maintaining low cost/high quality sources of protein and if negatively impacted, will likely drive increases in food costs and in turn, drive inflation and labour costs.[12]
Key portions of the value chain:
Tier 4, Tier 2, Use Phase 1, Use Phase 2.
UN Sustainable Development Goals: **6.6**

Figure 5 on page 16 summarises and illustrates the importance of water to textile and apparel companies, and to the sector, in these five categories.

“WE HAVE WASTED THE EARTH’S TREASURE AND WE CAN NO LONGER EXPLOIT IT CHEAPLY.”

Vivienne Westwood

In many apparel clusters (notably Southeast Asia), freshwater ecosystems are key sources of protein for the population through freshwater fisheries.

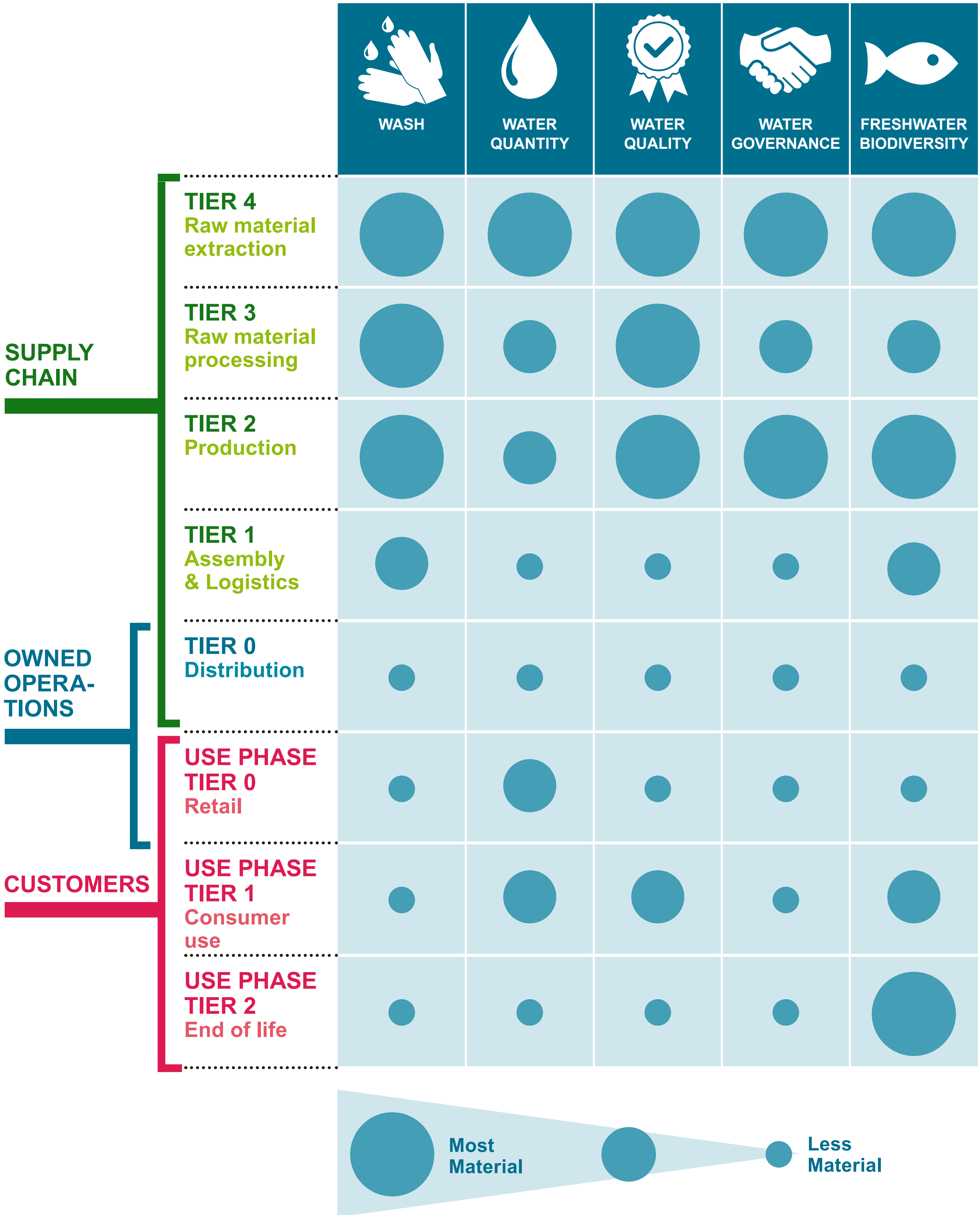


FIGURE 5. Illustrative representation of importance of water in the textiles value chain across five categories: WASH, Water Quantity, Water Quality, Water Governance, and Freshwater Ecosystems.

TYPICAL SOURCES OF WATER FOR A MANUFACTURER

Groundwater

Groundwater is the water found underground in the cracks and spaces in soil, sand, and rock. It is held in aquifers – permeable water-bearing rock and/or sediment – and can be extracted through wells. Groundwater is usually extracted through individual tube wells – water wells in which a long stainless steel tube or pipe is bored underground – for each factory, although sometimes through shared infrastructure, e.g., an industrial park or cluster.

Groundwater is often favoured for wet processing because it is relatively clean and often fairly poorly regulated – many governments in textiles production regions allow for unlicensed groundwater extraction. Even in places where groundwater extraction is licensed the extraction limits may not be effectively enforced, and this can result in extraction beyond sustainable levels.

Municipal water supply

It is also possible that factories are using municipal water sources as inputs to their processes, particularly if they are based near cities or in countries with extensive water infrastructure. Municipal water supplies are generally clean, and can be charged at a flat rate for access or pro-rata rate for volumes used – often at a subsidised or fairly low price.

Municipal water supplies in some countries might be under stress, depending on the sources they are using for their water, the competing demands on supply, and access to water by local populations. In some cases, lack of access to municipal water for local populations is as much about economic barriers such as lack of infrastructure or pricing, rather than competition for supply – so one should be cautious about assuming that high water use directly leads to poor access to water and sanitation for local populations. However in some countries, for example in South Africa, they are experiencing acute challenges with supplying adequate water to cities, meaning that use of municipal water sources in those contexts is likely to be high risk, controversial or banned entirely.

Surface water

Some sites will draw water from surface water sources, such as rivers, lakes or other water bodies. This can mean that water needs to be treated before use in wet processing. Surface water sources can potentially vary quite a bit in terms of availability, for example due to seasonal changes, droughts, use by other water users, or changes in rainfall. For this reason, it is less common to use surface water as inputs to wet processing, although many sites discharge wastewater to surface water bodies. If untreated prior to discharge the wastewater can cause significant pollution, and this has an impact on the ecosystem and all downstream users with water quality, water quantity, and WASH potentially being affected.

These categories are broadly consistent with how Sustainable Development Goal (SDG) 6 (Water) is structured, as well as the outcome areas listed within the Alliance for Water Stewardship (AWS) standards. Whilst there are a few other elements that need integration into such a framework (e.g., water-related areas of high socio-cultural importance could fit into governance), this framework offers a relatively simple way of organising the complexity of water as a topic.

These categories are broadly consistent with how Sustainable Development Goal (SDG) 6 (Water) is structured.

What is particularly notable is that these impacts and dependencies vary considerably throughout the apparel and textiles value chain and accordingly, it is important to understand how water issues are distributed along the value chain.

CASE STUDY – Dhaka City, Bangladesh

Groundwater levels in Dhaka City are rapidly decreasing as this megacity continues to grow and becomes more and more densely populated. A recent study showed that already in central Dhaka, groundwater rates decline at a rate of approximately 2-3m/ year in 2018. This same study quoted a daily use of 2.4 billion litres used by the city on a daily basis but the trend in population growth predicts an increase in daily water demand of up to 3.5 billion litres per day by 2023. The excessive population growth coupled with decreased precipitation and increased temperatures inflicts even more strain on the aquifer's recharge during the monsoon season as drought conditions have become more frequent.

As groundwater levels continue to drop, the Dhaka Water Supply and Sewerage System (DWASA) plans to install an additional 95 deep tube wells, increasing operating costs and business risk. Additionally, the quality of the groundwater has declined over the last 30 years and the trend is continuing.[13]

The textile and leather sectors in Bangladesh are predominantly using abstracted groundwater to meet their water needs. In some areas the current rate of abstraction is already thought to be unsustainable, and with significant projected growth of the industry in Bangladesh in the coming years, water demand could increase by 250% by 2030. The water demand from the textile industry alone is projected to be almost three times the future private/ household demand in Dhaka.[14]

Women queuing to get access to the raised tube well, Dhaka, Bangladesh.

The factory floor of a textile factory in Bangladesh.

CASE STUDY: Kanpur, Northern India

Kanpur is a major production hub for leather, and has around 270 active tanneries. Currently it is estimated that about two thirds of the wastewater that is produced by the tanneries is returned to the river without being treated. This impacts on communities and nature, for example:

- By contributing to a significant decline in the number of fish in the Ganges river since the 1950s, observed most significantly at Kanpur. This affects local communities who have had to change their diet, as the carp that used to make up the bulk of their diet have been impacted more greatly than other types of fish.
- Leading to concentrations of chromium (almost entirely due to the tanneries) of up to 100 times the level pre-scribed by the World Health Organisation for drinking water.
- Local authorities had to shut down tanneries many times due to the escalating pollution levels in the Ganges. For example, in January 2013, 400 tanneries in Kanpur were forced to close for 45 days during the Kumbh Mela, a large religious festival on the banks of Ganges river where millions of people enter the water to bathe.

In February 2015, the district administration stopped the power supply to 98 tanneries for releasing toxic effluent into the Ganges. These tanneries were allowed to reopen in May 2015 but only on the condition that they upgrade their treatment technologies.[15]

Untreated wastewater in Kanpur, India.

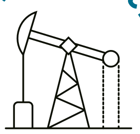
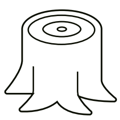
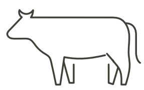
Discoloured groundwater near Kanpur, India, believed to be due to contamination with toxic chromium sulphate from the leather industry.

Leather hides drying in the sun, near Kanpur, India. Wastewater from the city's tanneries is a major contributor to the pollution of the Ganges River.

Water quantity and quality challenges in each production tier and use stage of the apparel & textiles value chain

Water is used throughout an apparel company's value chain, with impacts on water in all the categories mentioned above. Of these five categories, the two main drivers are water quantity and water quality as they influence the level of impact on WASH, governance, and freshwater ecosystems. For this reason, in the section below we have given an overview of each production and use stage in the apparel and textiles value chain and the resulting key impacts on and from water quantity and water quality. A more detailed and in-depth overview can be found in Appendix B.

TIER 4

WATER QUANTITY		WATER QUALITY
• Rain-fed crops susceptible to unpredictable weather patterns • Disproportionate use of irrigation water	**AGRICULTURE**  Growing raw, natural materials like cotton, which may be used directly or as an input in cellulosic fibers.	• Runoff of pesticides and fertilizers into rivers • Poor farming practices lead to soil erosion • Acidification, eutrophication and atmospheric pollution due to leaching of nutrients
• High water-use during hydraulic fracturing	**OIL-BASED EXTRACTION**  Extraction of oil for processing into synthetic fibres such as nylon, polyester, polypropylene, or elastane.	• Water produced as a result of oil extraction may contaminate groundwater and may lead to earthquakes
• Increase in forestry may result in increased use of rainwater causing a tradeoff between forestry and human and other ecosystem services	**WOOD-BASED SOURCES**  Trees are harvested by the forestry industry, turned into wood pulp, and used for various man-made cellulosic fibres.	• Decreased water quality due to the use of inorganic fertilizers and synthetic pesticides • Eutrophication of water bodies leading to harmful impacts on biodiversity.
• Intense water usage for animals' feedstock production	**LIVESTOCK FARMING**  Farmed livestock is important for the production of wool, leather, and by some definitions silk.	• Runoff from animal waste can significantly contaminate water bodies due to the presence of ammonia, nitrogen and phosphorus

TIER 3

CULTIVATED FIBER PROCESSING

Removing seeds, contaminants and spinning into fibres

WATER QUANTITY

• Minimal water use

WATER QUALITY

• Not significant

CELLULOSIC FIBER PROCESSING

Trees are harvested by the forestry industry, turned into wood pulp, and then used to produce cellulosic materials such as rayon, lyocell and modal.

WATER QUANTITY

• High water use required for timber and pulp processing

WATER QUALITY

• Release of very high pollutant loads including highly toxic benzene and dioxins.

SYNTHETIC FIBER PROCESSING

Turning oil into synthetic fibres

WATER QUANTITY

• Minimal water use

WATER QUALITY

• Potential for significant water pollution from petrochemical processing

WOOL PROCESSING

Wool needs to be scoured, carded or combed and spun to make into fibre.

WATER QUANTITY

•Scouring of wool uses fairly high quantities of water

WATER QUALITY

• Most of the scouring effluent is alkaline consisting of high BOD and COD loads.

TIER 2

WATER QUANTITY		WATER QUALITY
• Minimal water use	**WEAVING / KNITTING** Typically performed with electrically-powered automated machines, - interlacing of loops of yarns/threads sometimes use water jets.	• Generally low impact
• Dyeing requires large volumes of water	**FABRIC DYEING** Numerous processes are linked to dyeing, most of which involve an aqueous medium. Fabrics are also typically washed before being passed along.	• Dyeing, bleaching, mercerizing and other processes have significant impacts on key water parameters and may cause metal contamination.
• Water is the most important input into tanning processes and often significant quantities are lost to spillage and leaks	**LEATHER PROCESSING** Leather processing includes pre-tanning (cleaning/pickling), tanning (preserving), and wet finishing/finishing (stabilizing, coloring, & preparing hide for use).	• Almost every tanning process produces wastewater including salts, sulphides, chromium, ammonium salts and polyphenolic compounds (tanning), and dyes and solvents (wet-finishing).

TIER 1

WATER QUANTITY		WATER QUALITY
• Minimal water usage	**CUTTING / SEWING** Cutting and sewing the fabric into garments.	• Low impacts to water quality
• Medium water usage	**FINISHING** The main steps of finishing include washing and drying, stabilizing, and pressing.	• Dyes and other pollutants including microfibers are released into washing water.
• Shipping (in riverine waterways) can be impacted by low water volumes, but does not require water directly. • An overabundance of water (i.e., flooding) can often affect logistics.	**LOGISTICS** Logistics of shipping garments from garment factories to distribution centers.	• Shipping can discharge significant effluent into water bodies (both riverine and coastal waters).

TIER 0

WATER QUANTITY		WATER QUALITY
• Distribution Centers have typically only minor dependencies for employee/customer use and cleaning, and potentially landscaping, and HVAC.	**DISTRIBUTION CENTERS** Products are stored in distribution centers prior to shipment to wholesalers and retailers.	• Water quality impacts from distribution centers are generally low (and handled by municipal wastewater treatment).

USE PHASE 0

WATER QUANTITY

• Stores typically have only minor dependencies for employee/customer use and cleaning, and potentially landscaping and HVAC.

RETAIL

Selling of products from brands and stores to customers.

WATER QUALITY

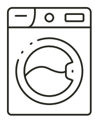
• Water quality impacts from stores are generally low (and handled by municipal wastewater treatment).

USE PHASE 1

WATER QUANTITY

• Washing garments uses significant volumes of water.
•Washing machines require varying amounts of water.

LAUNDRY



Washing of garments by customers.

WATER QUALITY

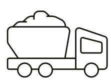
• Untreated laundry discharge contains detergents, nutrients and microfibers that negatively impact biodiversity.

USE PHASE 2

WATER QUANTITY

• Landfill disposal and recycling of garments does not require large amounts of water.

DISPOSAL / RECYCLING



The end-of-life stage of garments, which could be a landfill or a recycling center.

WATER QUALITY

• Potential for textiles to leach chemicals into soil and groundwater while decomposing in a landfill.
• Chemical recycling could have impacts to water quality if waste is not managed responsibly.

The picture that emerges from this review is that not only is it important to adopt a value chain perspective when it comes to water, but there are key areas to place disproportionate emphasis on: **Tier 4** (basically all aspects of raw material production), **Tier 3** (cellulosic & synthetic fibre processing), **Tier 2** (wet processing – dyeing and leather processing), **Use Phase 1** (customer use phase) and **Use Phase 2** (end-of-life stage). End of life management also presents value creation opportunities with smart technologies and circular business models, which can reduce water footprint and make an apparel company more competitive (see Report Part III).

CONCLUSION: PART I

Water is an issue that is gaining increasing attention within the apparel and textile industry. While many leading brands now have an improved understanding of both the risks and opportunities that link to water – a resource material to their value chain as well as to their customers, employees, communities and investors – there is still a long way to go to achieve significant impacts on water resources.

As awareness and understanding of water grows, the industry is coming to recognize that water is not "one issue" but rather a collection of a series of interconnected issues: WASH, water withdrawal/scarcity, water quality, water governance and freshwater ecosystems interact along with the broader issues of climate change and biodiversity to make up "water". Each of these different issues also varies through space and time, making context critical when evaluating water risk and opportunity (where we turn next in Part II).

When it comes to water in the apparel and textiles industry, it is all about the value chain. In particular the picture that emerges is that the industry needs to take a full value chain perspective when addressing water issues, though Tier 4 and Tier 2 are particularly critical as there are significant impacts and dependencies on water in these stages of the value chain.

As the industry responds to these growing water challenges along the value chain, collaboration will remain critical. From sharing learnings to lessons and from data to solutions, water challenges, precisely because of their shared nature, tend to push us to work together. Tackling water along the value chain represents a challenge to the sector, but it will also create a series of opportunities to enhance resilience and further strengthen sustainability.

To gain a better sense of how the industry can move from recognizing the challenges of water to deploying a transformative vision, see Part III.

"WE NEED TO TAKE INDUSTRY-WIDE ACTION TO CREATE A FUTURE IN WHICH WATER IS PRESERVED AND PROTECTED FOR EVERYONE. THE WAY FASHION IS PRODUCED AND CONSUMED TODAY CLEARLY HAS AN IMPACT, AND WE NEED TO TAKE THE RESPONSIBILITY TOGETHER TO ACCELERATE THE CHANGE."

Helena Helmersson, CEO, H&M Group

APPENDIX A.

KEY WATER QUALITY PARAMETERS WITH THRESHOLD VALUES LISTED AT A SAFE LEVEL:

Parameter	Unit	Threshold value (ZDHC Foundational)
AOX (Adsorbable Organically bound halogen)	mg/l	3
COD or TOC	mg/l	150
Oil & Grease	mg/l	10
Sb	mg/l	0.1
Cr (VI)	mg/l	0.05
Cu	mg/l	1.00
Ni	mg/l	0.2
Zn	mg/l	5
S2-	mg/l	0.5
Total N	mg/l	20
Total P	mg/l	3
TSS	mg/l	50
pH	—	6–9
BOD 5	mg/l	30
E.coli	CFU/100-ml	126

Source: ZDHC Wastewater Guidelines Version 2.0 (March 2022)

APPENDIX B.

WATER QUALITY AND WATER QUANTITY CHALLENGES IN EACH PRODUCTION TIER OF THE APPAREL & TEXTILES VALUE CHAIN:

TABLE 1. Water quantity and quality challenges in Tier 4 of the apparel & textiles value chain.

TIER 4 ISSUES		
Category	**Water Quantity**	**Water Quality**
Agriculture: *Growing raw, natural materials such as cotton, linen (flax) and hemp (which may be used directly or as an input in cellulosic fibres)*	Rain-fed crops are susceptible to changes in rainfall patterns and climate change but do not compete with other rainfed crops for water. Irrigated crops do. Water for irrigated crops can be surface water, groundwater or a combination of both with variations largely being a function of regional availability at different times of the year. However, how much irrigation water is used, and from which sources, is highly variable depending on the crop type, precipitation, location, soil, local infrastructure and farming practices.	Runoff of pesticides and fertilisers from fields can drain into rivers and groundwater, leading to pollution. Similarly, poor farming practices lead to soil erosion, which also impacts water quality, while removal of riparian areas not only exacerbates the impacts above, but also can contribute to changes in water temperature, which is another form of water quality impact. A persistent surplus of nutrients creates potential environmental problems. For example, excessive ammonia emissions contribute to acidification, eutrophication and atmospheric particulate pollution. Excess accumulation of soluble salts in water and soil lead to salinity problems which affect water quality and potentially hinder plant productivity. Likewise, nitrogen and phosphorus leaching result in the eutrophication of surface waters. Conversely, a persistent deficit in nutrients indicates a decline in soil fertility (i.e., soil biodiversity health). As with consumptive water use, the water quality impacts of crops varies considerably by crop type, location, soil, infrastructure and farming practices, with the latter being perhaps most critical. Grey water footprints for cotton cultivation also vary considerably bygeography with a range from 965 litres/kg (India) to 32 litres/kg (Australia)[16].

TABLE 1 continued: Water quantity and quality challenges in Tier 4 of the apparel & textiles value chain.

TIER 4 ISSUES		
Category	**Water Quantity**	**Water Quality**
Oil-based extractions: *Extraction of oil for processing into synthetic fibres such as nylon, polyester, polypropylene, or elastane.*	Water is used to drill and hydraulically fracture ("frack") wells, refine and process oil. Water use intensity varies considerably by region and water use estimates in the United States for oil and gas wells are in the range of 15.3 litres/gigajoule (with figures also suggesting a general rise in water use intensity in recent years)[17]. That is, the estimated blue water footprint of petrochemical polyester (which includes both Tier 4 and 3) is estimated at between 30 litres/kg and 52 litres/kg[18].	Water is also naturally present in the rocks that contain oil and is extracted alongside it. This process results in between 1 and 100 barrels of water being "produced" per barrel of oil (with the US average at 10 barrels)[19] . This "produced water" is typically contaminated water. This equates to 10 billion litres of contaminated water being generated every day[20]. Most of this produced water is then injected underground (either to enhance oil recovery or simply for disposal)[21], where it has the potential to contaminate groundwater or even cause earthquakes. It should be noted that management of this water may differ according to local geology, financial constraints, and regulations. In addition to underground injection, contaminated water may also be treated and reused, or allowed to evaporate in surface pits – which can affect local air quality, or create contamination of groundwater supplies from leaking pits. The estimated grey water footprint of petrochemical polyester (which includes both Tier 4 and 3) is estimated at between 50,640 litres/kg and 71,377 litres/kg[22].
Wood-based sources: *Trees are harvested by the forestry industry, turned into wood pulp which is in turn used for various man-made cellulosic fibres. Other materials such as bamboo (technically a grass) may also be used. Note that this may be via plantations or more natural forests.*	There may be demonstrated benefits to a local hydrological system by having wooded areas nearby as trees do use significant amounts of water. According to the Water Footprint Network (WFN), the increase in volumes of forestry across the world between 2001–2010 led to a 25% increase in rainwater consumption[23], meaning that rainwater sources have potentially been drawn away from other human and ecosystem service uses. As with other crops, the location and species of trees has a significant impact on consumptive water use. Cultivated fibre (typically from plantations) for viscose is estimated at between 33 and 55 litres/kg[24].	Commercial forestry can spray trees with inorganic fertilisers and synthetic pesticides to improve growth, often creating a high amount of excess chemical pollution in the process. This can be transferred into water bodies where it can create eutrophication – high growth of plants and algae followed by de-oxygenating of the water which can harm fish and other freshwater species. Furthermore, poor forestry practices can be significant contributors to sediment and soil loss, as well as temperature changes, impacting downstream water quality. *NB: WFN has not calculated grey water footprints for viscose plantations.*

TABLE 1 continued: Water quantity and quality challenges in Tier 4 of the apparel & textiles value chain.

TIER 4 ISSUES		
Category	**Water Quantity**	**Water Quality**
Livestock farming and slaughter: *Farmed livestock is important for the production of wool, leather, and by some definitions silk. Leather is a by-product of the meat industry for almost all leather types.*	Water is used directly for livestock to drink in small amounts, but the main impacts are usually related to animals' feedstock. The Water Footprint Network estimates that 1% of the total water footprint of a cow is direct water for drinking, and 99% is from indirect use. The water footprint of animal products depends on the production system (grazing, mixed or industrial) and feed sources used. A cow has a lifetime average water footprint of 1,890,000 litres. 5.5% of this impact is attributable to leather – approximately 15,916 litre/kg, mostly from rain fed sources with around 4% from irrigated sources[25]. However, these numbers can vary considerably depending on the production processes and location. The global average water footprint of pig meat is 5,990 litre/kg, and for sheep meat it is 10,400 litre/kg, 3% of the total water footprint of animal production in the world[26]. Data is not available on the proportion allocated to leather or wool, but the relative water footprint values per animal are likely to be mirrored in the relative water footprint values in the leather or wool.	Water quality impacts from livestock farming can be significant, particularly from animal waste running off into water bodies. This includes ammonia, nitrogen, phosphorus, biological pathogens, oxygen demand, temperature and antibiotics. The grey water footprint from bovine (leather) sources is estimated at roughly 500 litres/kg[27]. For example, cattle in the US produced 750 million tons per year of overall waste, equating to 4.1 million tons of nitrogen and 1 million tons of phosphorous per year. For sheep, these numbers were 3 million tons/yr total waste, 32,000 tons/yr nitrogen, and 6,500 tons/yr phosphorous[28]. In the western United States, manure accounted for 39% of phosphorous and 53% of nitrogen input to watersheds in 1995, strongly correlated with increases in the concentration of livestock populations in the watersheds[29]. A study in Ireland in 2016 also found that proximity of cows to rivers was likely to compromise their ability to meet water quality requirements under the EU Water Framework Directive[30]. In addition, the water quality impacts (notably nitrogen and pesticides) of feed crops can also be significant depending upon farming practices.

TABLE 2. Water quantity and quality challenges in Tier 3 of the apparel & textiles value chain.

TIER 3 ISSUES		
Category	**Water Quantity**	**Water Quality**
Cultivated Fibre Processing: *Removing seeds, contaminants and spinning into fibres*	Ginning and spinning of fibres like cotton does require some water, but the quantity of water needed is not as high compared to cotton production and textiles finishing.	Ginning and spinning of fibres like cotton does not create high levels of water pollution.
Synthetic Fibre Processing: *Turning oil into synthetic fibres*	Synthetic fibres are only one of many products created through the refining of petrochemicals. Production of polyester fibres requires minimal amounts of water and as noted above (combined with Tier 4) is estimated to use between 30 and 52 litres of water per kg of polyester yarn/fibre produced[31].	Synthetic fibre creation produces significant pollution. Pollutants potentially released from petro-chemical processing and polyester fibre production could include: phenol, benzene, oil and grease, dissolved and suspended solids, cadmium, chromium, copper, vinyl chloride, sulphide and nitrogen. Note: processes and wastewater treatment vary significantly depending on site practices and legislative controls. As noted above, the estimated grey water footprint of polyester (combined with Tier 4) is between 50 and 70,000 litres/kg[32].
Cellulosic Fibre Processing: *Trees are harvested by the forestry industry, turned into wood pulp, and then used to produce cellulosic ma-terials such as rayon, lyocell and modal. Other materials such as bamboo may also be used.*	Water use is primarily found in the processing of timber and pulp, to transform wood into clothing fibres. Sawmills take water for wood pro-cessing in the sawmill, including for cooling saw blades and in the process of preserving wood. Pulp mills require large quantities of water in their production systems, although some have programmes to actively reduce water use or recycle water. The blue water footprint for viscose processing varies heavily by the type of process and is estimated at between 80 and 370 litres/kg[33].	Effluent from pulp mills can also contain high pollutant loads, including nutrients and organic matter, and highly toxic dioxins and benzenes. Wastewater treatment standards vary depending on location, on-site stand-ards and regulations. For viscose, where roughly 90% of the water footprint lies in its water quality impacts, the grey water footprint is estimated at between 3,192 and 30,489 m^3/kg depending on the form of processing[34]. Highly toxic chemicals (such as carbon disulphide) are used to convert wood pulp into cellulosic fibres. Most major producers of cellulosic fibres have closed-loop systems to prevent pollution, but standards vary particularly for sites that are smaller or in weak regulatory environments.
Wool Processing: *Wool needs to be scoured, carded or combed and spun to make into fibre.*	Scouring uses fairly high quantities of water, approximately 178,000 litres per day on average in the sites studied[35,36].	Scouring involves the use of hot water and detergents to remove soil, vegetable impurities, grease and other contaminants from fibres. Wool scouring typically uses water and alkali, although scouring with an organic solvent is also possible. Scouring with alkali breaks down natural oils and surfactants and suspends impurities in the bath. The scouring effluent is strongly alkaline, and a significant portion of BOD and COD loads from textile manufacturing arises from scouring processes.

TABLE 3. Water quantity and quality impacts in Tier 2 of the apparel & textiles value chain (from verified 2018 Higg FEM data, N=1,871).

TIER 2 ISSUES		
Category	**Water Quantity**	**Water Quality**
Weaving / Knitting: *Typically performed with electrically-powered automated machines, the process involves interlacing of loops of yarns/threads which sometimes use water jets.*	There may be some dependence upon water for weaving. There is also some dependence in weaving/knitting factories for worker use and cleaning.	Water quality impacts from knitting/weaving are generally low.
Fabric Dyeing: *There are numerous processes linked to dyeing, most of which involve an aqueous medium. As fabrics are finished they are also typically washed before being passed along.*	Dyeing processes are quite water intensive, requiring large volumes of water creating a high water depend-ency in many cases, especially where older technologies are involved.	Dyeing, bleaching, mercerizing and other aqueous treatment processes have significant impacts on COD, pH, temperature, metal contamination, amongst other impacts.
Leather Processing: *Leather goes through many steps of processing, mainly divided into pre-tanning (cleaning/pickling), tanning (preserving), and wet finish-ing/finishing (stabilising the hide, colouring it, and preparing it for use).*	Water is probably the most im-portant input into tanning processes. Approximately 40–45 litres of water is used per kg of hide, equivalent to 30 billion litres worldwide per year[37,38]. Water use estimates vary considerably by study and tannery with a 2016 study[39] citing a range from roughly 15–215 L/m² (of hide) or roughly 9.8–140.9 litres/kg hide[40], while a 2001 study[41] indicated that soaking uses approximately 6–9 litres per kg hide, liming uses 4–6 litres/kg, deliming approx. 5 litres/kg, pickling approx. 1 litres/kg, Chrome tanning and re-tanning a total of approx. 3.5–5 litres/kg of hide, neutralisation 5–6 litres/kg. The total process is estimated to use around 34 litres per kg of hide, including around 40% lost to spillage and leaks, but that with improved technologies, this can be lowered to 12.7 litres/kg of hide.	During the tanning process, at least ±300 kg chemicals (lime, salt etc.) is added per ton of hides[42]. Over 80 per cent of the organic pollution load in BOD terms emanates from the pre-tanning phase; much of this comes from degraded hide/skin and hair matter. Every tanning process step, with exception of the crust finishing operations, produces wastewater. An average of 35 litres is produced per kg of raw hide. This wastewater contains: salts (Cl), fat, protein, preservatives (soaking), lime and ammonium salts, ammonia, protein (hair), and sulphides (fleshing, trimming, bating); chromium(salts) and polyphenolic compounds (tanning); and dye and solvent chemicals (wet-finishing).

TABLE 4. **Water quantity and quality impacts in Tier 1 of the apparel & textiles value chain (from verified 2018 Higg FEM data, N = 1,871)**

TIER 1 ISSUES		
Category	**Water Quantity**	**Water Quality**
Cutting/ Sewing: *Cutting and sewing the fabric*	Typically there are only minor dependencies in cutting/sewing factories for worker use and cleaning.	Water quality impacts from cutting/sewing are generally low.
Finishing: *Washing & rinsing may occur in different phases, but generally garments are washed as part of the finishing process. The main steps of finishing include washing and drying, stabilising, and pressing. In addition, some fabrics are then treated to make them water repellent, anti-static, etc.*	Washing/rinsing processes generally use less water than in the dyeing stage, but there is still some water use in this phase.	Any garment washing tends to release some dyes and other pollutants, including the shedding of microfibers.
Logistics and Shipping: *Logistics of shipping garments from garment factories to distribution centres.*	Shipping (in riverine waterways) has the potential to be impacted by low water volumes, but does not require water directly. It is worth noting that an over-abundance of water (i.e., flooding) can often affect logistics.	Shipping can discharge significant effluent into water bodies (both riverine and coastal waters).

TABLE 5. **Water quantity and quality impacts in Tier 0 of the apparel & textiles value chain.**

TIER 0 ISSUES		
Category	**Water Quantity**	**Water Quality**
Distribution Centres	Distribution Centres have typically only minor dependencies for employee/customer use and cleaning. Water may also be used for landscaping and heating, ventilation, and air conditioning (HVAC).	Water quality impacts from distribution centres are generally low (and handled by municipal wastewater treatment).

TABLE 6. **Water quantity and quality impacts in Use Phase 0 of the apparel & textiles value chain.**

USE PHASE 0		
Category	**Water Quantity**	**Water Quality**
Retail: *Selling of products from brands and stores to customers.*	Stores typically have only minor dependencies on water for employee/customer use and cleaning. Water may also be used for landscaping and HVAC.	Water quality impacts from retail stores are generally low (and handled by municipal wastewater treatment).

TABLE 7. **Water quantity and quality impacts in Use Phase 1 of the apparel & textiles value chain.**

USE PHASE 1		
Category	**Water Quantity**	**Water Quality**
Laundry: *Washing of garments by customers requires significant volumes of water and has the potential to discharge nutrients, but detergents also have deleterious effects on aquatic biodiversity.*	Washing machines also require varying amounts of water, which is the basis for the washing process. While newer technologies have lowered water requirements, there are still dependencies.	Untreated laundry discharge contains detergents which often contain nutrients (e.g., phosphorus) as well as acting as a surfactant that negatively impacts aquatic biodiversity. Washing also leads to the release of microfibers.

TABLE 8. **Water quantity and quality impacts in Use Phase 2 of the apparel & textiles value chain.**

USE PHASE 2		
Category	**Water Quantity**	**Water Quality**
Disposal/ Recycling: *The end of life stage of garments.*	Landfill disposal and recycling of garments does not require large amounts of water.	Whether it be in a landfill or in a recycling facility, garment disposal has impacts on water quality, although this is not often considered. There is potential for textiles to leach chemicals into soil and groundwater during the decomposition process. Chemical recycling also produces waste that can impact water quality if not managed responsibly.

WWF – Word Wide Fund for Nature – one of the world's largest conservation organizations

The World Wide Fund for Nature (WWF) is one of the world's largest and most experienced independent conservation organizations, with over 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

As a part of its efforts to achieve this mission, WWF has partnered with many fashion companies (e.g., H&M Group, PVH Corp and Tommy Hilfiger, Levi Strauss & Co, Gap Inc., and others) and peer organisations on an approach called 'Water Stewardship'.

Adopting Water Stewardship requires not only impact reduction activities with manufacturers and materials (i.e., water management), but also asks companies to address shared water challenges and governance in basins through collective action with other businesses, governments, NGOs and communities. These key water users work together to create shared solutions to shared water risks, with a focus on collective solutions to underlying problems and with the goal to ultimately strengthen water governance in partnership with policymakers.

You can find out more about WWF's work on water stewardship here

You can find out more about WWF's on-ground work with the apparel and textiles industry here

Glossary

Ambient Water Quality: Natural, untreated water in rivers, lakes and groundwaters that is affected by a combination of natural influences and anthropogenic activities, such as inputs from wastewater or agricultural run-off. SDG 6.3.2 is defined as the proportion of bodies of water with good ambient water quality.[43]

Blue water: Fresh surface and groundwater, in other words, the water in freshwater lakes, rivers and aquifers.[44]

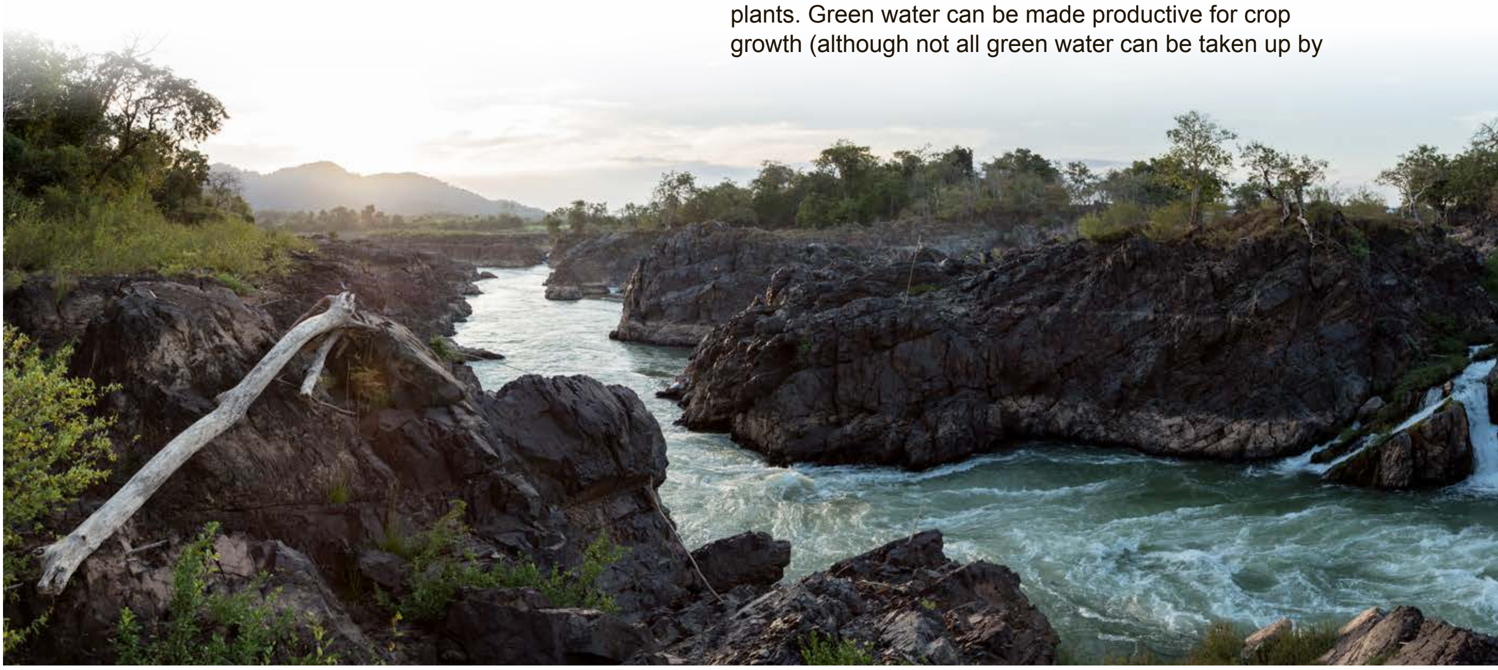
Blue water footprint: The volume of surface and groundwater consumed as a result of the production of a good or service. Consumption refers to the volume of freshwater used and then evaporated or incorporated into a product. It [consumption] also includes water abstracted from surface or groundwater in a catchment and returned to another catchment or [directly to] the sea. It is the amount of water abstracted from groundwater or surface water that does not return to the catchment from which it was withdrawn.[45]

Consumptive use: The part of water withdrawn that is evaporated, transpired, incorporated into products or crops, consumed by humans or livestock, or otherwise not available for immediate use. Water returned to a different watershed than the point of withdrawal (interbasin transfer) is not considered a consumptive use. Also referred to as water consumed.[46]

Freshwater ecosystems: A subset of Earth's aquatic ecosystems. They include lakes, ponds, rivers, streams, springs, bogs, and wetlands.[47]

Freshwater withdrawal: The volume of freshwater abstraction from surface or groundwater. Part of the freshwater withdrawal will evaporate, another part will return to the catchment where it was withdrawn and yet another part may return to another catchment or the sea.[48]

Green water: The precipitation on land that does not run off or recharge the groundwater but is stored in the soil or temporarily stays on top of the soil or vegetation. Eventually, this part of precipitation evaporates or transpires through plants. Green water can be made productive for crop growth (although not all green water can be taken up by



crops, because there will always be evaporation from the soil and because not all periods of the year or areas are suitable for crop growth).[49]

Green water footprint: Volume of rainwater consumed during the production process. This is particularly relevant for agricultural and forestry products (products based on crops or wood), where it refers to the total rainwater evapotranspiration (from fields and plantations) plus the water incorporated into the harvested crop or wood.[50]

Grey water footprint: The volume of freshwater that is required to assimilate the load of pollutants based on natural background concentrations and existing ambient water quality standards. It is calculated as the volume of water that is required to dilute pollutants to such an extent that the quality of the water remains above agreed water quality standards. The grey water footprint of a product is an indicator of freshwater pollution that can be associated with the production of a product over its full supply chain.[51]

Material/Materiality: Companies use the concept of materiality to guide their sustainability strategic planning processes. A material sustainability issue is an economic, environmental, or social issue on which a company has an impact, or may be impacted by. It may also be one that significantly influences the assessments and decisions of stakeholders. It is important to draw a distinction between the concept of materiality as it refers to financial reporting, and the concept of materiality as it refers to sustainability reporting. With respect to financial reporting, information is deemed material if its omission or misstatement could influence the economic decisions of users taken on the basis of the financial statements (IASB Framework). In contrast, in the sustainability context, the term materiality refers to those issues that can have significant repercussions on the company (both positive and negative). As of yet, no formal monetary threshold has been applied to determine what is/what is not material.[52]

Shared Water Challenges: The water-related issues that are of interest or concern to both the site and to other stakeholders in the catchment and which, if addressed, will provide positive impacts or prevent negative impacts. Shared water challenges are not necessarily unique and may be the same for multiple sites or stakeholders.[53]

Stakeholders: Individuals, groups of individuals, organisations or other species that affect and/or could be affected by a standards system's activities, products, services or associated performance.[54]

Water footprint: An indicator of freshwater use that looks at both direct and indirect water use55 of a consumer or producer. The water footprint of an individual, community or business is defined as the total volume of freshwater used to produce the goods and services consumed by the individual or community or produced by the business. Water use is measured in terms of water volumes consumed (evaporated or incorporated into a product) and/or polluted per unit of time. A water footprint can be calculated for a particular product, for any well-defined group of consumers (for example, an individual, family, village, city, province, state or nation) or producers (for example, a public organisation, private enterprise or economic sector). The water footprint is a geographically explicit indicator, showing not only volumes of water use and pollution, but also the locations.[56]

Water quality: Water quality can be thought of as a measure of the suitability of water for a particular use based on selected physical, chemical, and biological characteristics.[57]

Water risk: Water risk is the potential for any asset or socio-ecological system to be adversely affected by a water related hazard.[58]

Water scarcity: The lack of sufficient available water resources to meet the demands of water usage within a region for environmental and human needs. Physical water scarcity is when there is insufficient water in natural water bodies. It may be a natural condition (eg. in arid regions), or may result from excessive water abstractions for human uses. Economic water scarcity is when there is insufficient supply to humans when water is naturally abundant. It is a result of under investment in water supply infrastructure, whether due to poverty or mismanagement.[59]

Water security: The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socioeconomic development, for ensuring protection against waterborne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability.[60]

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.[61]

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