WORLD TRAVEL & TOURISM COUNCIL

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WATER ROADMAP FOR TRAVEL & TOURISM

AN OVERVIEW AND ACTION FRAMEWORK TO REDUCE FRESHWATER USE AND BUILD WATER RESILIENCE

December 2023

CONTENTS

This report was prepared by WTTC in collaboration with Accenture.

FOREWORD

While the role of water in sustaining life and supporting economies is undeniable, the current trends exacerbated by the impacts of climate change demand collective efforts to recognise its true value and ensure the sustainable and equitable use of freshwater resources across industries and geographies.

Today, more than ever, we need leaders who are driven by a profound sense of purpose that goes beyond profit margins and have a vision for a regenerative future. The Travel & Tourism (T&T) sector, owing to its unique characteristics, plays a pivotal role in fostering connectivity and driving economic progress worldwide. It is also strategically positioned to have a substantial impact on human health and wellbeing, as well as the integrity of ecosystems.

The World Travel & Tourism Council (WTTC), in collaboration with Accenture, joined forces to provide data, share best practices and apply proven methodologies to address water challenges and inspire the journey ahead. The Water Roadmap builds on the work of practitioners, researchers and water advocates dedicated to drawing global attention to the urgency of adopting sustainable water practices. It highlights the transformative power of data and technology to drive collaboration and informed decision-making. It also provides Travel & Tourism businesses with guidance and tools needed to set water targets and navigate their way towards long-term sustainability and resilience.

As water-related challenges continue to gain momentum, as evidenced by the success of the UN 2023 Water Conference and a growing interest from the investor community, we are committed to providing further insights and solutions to foster a sense of shared responsibility for water resources within and beyond the Travel & Tourism sector.

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EXECUTIVE SUMMARY

PURPOSE OF THE REPORT

The purpose of this report is to **emphasise water[I] scarcity and resilience** as two significant global challenges and to **highlight the role the Travel & Tourism sector can play in responding to the water crisis**.

Specifically, the report aims to:

1. **Provide insights** into the Travel & Tourism sector's global water use and highlight regional and country-specific differences.
2. **Summarise water-related risks** and underline the necessity of strengthening the resilience and adaptative capacity of the Travel & Tourism sector.
3. **Offer guidance** to Travel & Tourism businesses on reducing their water footprint and building resilience to water-related risks.
4. **Issue a call to action** to Travel & Tourism businesses to set water targets, allocate resources for water-related initiatives, foster collaboration, and report progress.
5. **Underline the role of key partners**, including governments, regulators, water management agencies and basin authorities, in encouraging and facilitating water-related collective action on a global and local scale.

KEY INSIGHTS

The Travel & Tourism sector — which accounted for 1 in 10 jobs globally, 10.4% of global GDP and 8.1% of global greenhouse gas (GHG) emissions in 2019 — uses between **3.5 and 5.8% of global available freshwater, which is lower than many other industries**. In contrast, **the agriculture and food industry accounts for nearly 70%** of global freshwater usage[1]. Despite the Travel & Tourism sector's relatively low freshwater use, it remains heavily dependent on water and related ecosystems, and water scarcity or poor quality can significantly harm the customer experience and pose a threat to the viability of tourism destinations.

It is therefore imperative for Travel & Tourism businesses to prioritise water, particularly in areas of high water stress, for several reasons:

- High dependency on water (quality and access) and vulnerability to water-related risks,
- Local community impact, including improved access to water and sanitation, resulting in enhanced health,
- Reputation and stakeholder expectations to increase transparency and accountability for water,
- Potential to influence positive change and drive water excellence along supply chains and water basins,
- Long-term business value, resilience, and sustainability.

Addressing the global water crisis requires **balancing trade-offs** related to various water uses. This involves implementing **local, participatory, and resource-based approaches** that align with broader UN Sustainable Development Goals, such as promoting health and food security, eradicating poverty, and protecting and restoring ecosystems. The focus should extend beyond conserving freshwater resources to also encompass sustainable wastewater management, unlocking the potential for the generation of new jobs and revenue streams.[2]

I This report focuses on freshwater use in the Travel & Tourism sector. The terms "freshwater" and "water" are being used interchangeably.

While the water demand from the Travel & Tourism sector tends to be concentrated in specific locations and seasons, it can exert significant pressure on local water resources, e.g., in highly water-stressed regions during the dry season[3] or in ski resort areas reliant on snowmaking.[4] At the same time, Travel & Tourism businesses hold the capacity to **inspire a circular and regenerative shift**, which is essential to **reduce their vulnerability and make a positive contribution** to the overall health and integrity of the complex system within which they operate.

Even though **boardrooms do not yet fully recognise the urgency of the water crisis, the increase in extreme weather events and climate change uncertainty** underline the importance for Travel & Tourism businesses to **proactively navigate multi-faceted risk dynamics**. Considering that highly stressed water basins often exist in proximity to higher population densities,[5] it is also imperative to **underscore Water, Sanitation, and Hygiene (WASH) initiatives**. Finally, recognising that **food and agriculture account for nearly three-quarters of the entire Travel & Tourism sector's water use**, further investigation is needed to identify the most effective approaches to reduce the sector's overall water intensity.

CONTEXT

WATER – A SCARCE YET VITAL RESOURCE

**"As humanity's most precious global common good, water unites us all.
That is why water needs to be at the centre of the global political agenda".**
- UN Secretary-General António Guterres

The true value of water

Water, a **vital natural resource, sustains life on Earth** through the hydrologic cycle, powered by energy from the sun. It allows ecosystem services and functions, plays a significant role in regulating the climate, and supports various human activities. Although global water resources are ample, only 2.5% of the supply is freshwater (suitable for drinking, growing crops, etc). The majority of this freshwater is locked up in glaciers, ice caps, and ice sheets, or sequestered deep underground, leaving **less than 1% readily available for human use**. Therefore, the true **value of water, including wastewater**, **is often overlooked** and its importance is not adequately recognised due to a **lack of proper policies, pricing, and incentives**.[6] In fact, the latest report from the World Wildlife Fund (WWF) has estimated that **freshwater economic value reached $54 trillion in 2021 (i.e., 60% of global GDP).**[7]

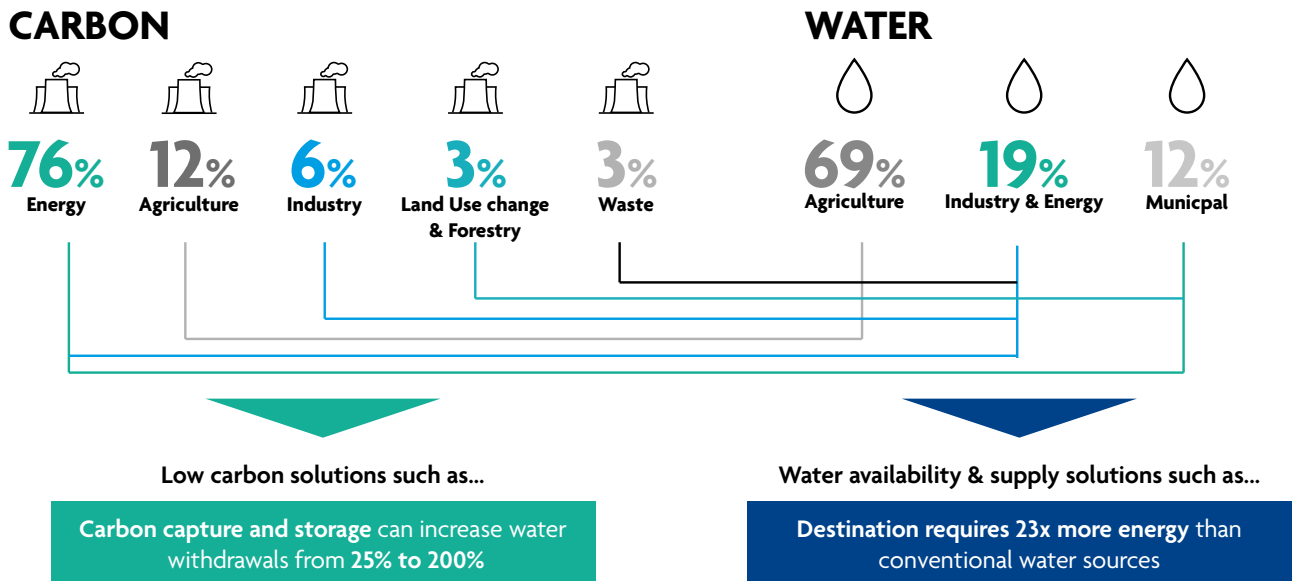
Urgency of the global water crisis

Growing water scarcity has become **one of the most pressing challenges for sustainable development** due to decades of inadequate management, underinvestment, insufficient transboundary collaboration, and deterioration of water-dependent ecosystems.[8] Estimates show that with current practices, the world is projected to face a **40% shortfall between forecasted demand and available supply of water by 2030**,[9] leading to increased global competition for water, escalating **tensions and exacerbating social inequalities**.

Water-Energy-Food Nexus

Although **"water footprint"** and **"carbon footprint"** refer to different environmental impacts, they are related in several ways. Many **carbon-intensive activities**, such as power generation, agriculture, and industrial processes **require significant water use** (Figure 1). **Some low carbon solutions**, such as carbon capture and storage (CCS) and nuclear power **are also relatively water-intensive**.[10] At the same time, energy-intensive processes associated with water supply, conveyance, and treatment contribute to greenhouse gas (GHG) emissions. As an illustration, the island of Aruba, due to a lack of its own freshwater sources, heavily relies on **desalination plants** leading to a **substantial carbon footprint**, as well as risks to marine life caused by brine disposal.[11]

Figure 1: Carbon emissions and water links examples



Sources: WRI - World Greenhouse Gas Emissions in 2019 | Valuing Water, United Nations (2021) | IPCC Climate Change 2022: Mitigation of Climate Change report (p.643)
Notes: Carbon emissions allocation percentages are based on greenhouse gas emissions reported in CO_2 equivalents | Water represents freshwater use.

The **disruption of precipitation patterns and the water cycle** caused by increasing temperatures is intensifying both water scarcity and water-related hazards, such as floods and droughts, leading to **emergencies in various water-dependent sectors**. While agriculture already accounts for over two-thirds of global water use, the increase in income has resulted in a **higher demand for water-intensive animal products, such as meat and dairy.** [12] This trend poses a **considerable challenge to water resources worldwide**.

Consequently, it has become increasingly important to understand the so-called **"Water-Energy-Food Nexus"**,[13] in order to tackle the multifaceted challenges and trade-offs related to sustainable and equitable allocation of water resources across industries and regions.

The global water action agenda

2.2 BILLION
People do not have access to safely managed drinking water

4.2 BILLION
People do not have access to safe sanitation services

3 BILLION
People lack basic handwashing facilities

Source: UNICEF, WHO

Over 1000 children die every day from diseases linked to unsafe water, sanitation and hygiene.

Source: UNICEF

In 2010, the UN General Assembly officially recognised the **right to safe and clean drinking water and sanitation** as a fundamental human right,[14] which has led to **increased advocacy and efforts** to address water and sanitation challenges globally. **Ensuring availability and sustainable management of water and sanitation for all (SDG 6)**, has been listed as one of the 17 goals that provide a comprehensive framework underpinning the **2030 Agenda for Sustainable Development**[15] adopted in 2015 by all UN Member States.

SDG 6 comprises specific targets emphasising equitable access to clean water and sanitation, addressing water pollution, promoting sustainable management of water resources, protecting and restoring water-related ecosystems and fostering collaboration (see Figure 2).[16] In addition, SDG 11.5 and SDG 13.1 underscore the need for **strengthening resilience and adaptive capacity to extreme water-related weather events**, which has become highly relevant, considering that **nine out of ten natural disasters are water-related**.[17]

Figure 2: SDG 6 and associated water challenges

SDG 6 Clean Water and Sanitation	Water Challenges
Water, Sanitation, and Hygiene (SDG 6.1 and SDG 6.2)	People and communities lack sufficient access to safe and affordable drinking water, sanitation, and hygiene.
Water Quality (SDG 6.3)	Water that presents health threats to humans and/or ecosystems. Water that is unfit for its intended use due to quality impairments.
Water Quantity (SDG 6.4)	Demand (human and environmental) for water exceeds the available supply indicating water resources are out of balance.
Water Governance (SDG 6.5)	The political, social, economic, and administrative systems which affect the use, development and management of water resources are ineffectual, corrupt, underfunded, or otherwise inadequate.
Important Water-related Ecosystems (SDG 6.6)	Water-related areas of environmental and cultural significance are degraded and there is a loss of freshwater ecosystems.

Source: Adapted from UN Global Compact CEO Water Mandate (p.14)

Water-related challenges have recently gained notable traction. For example, the **UN 2023 Water Conference**, held in New York City from March 22-24, brought together governments, industry, and civil society to mobilise the resources needed to address the urgent water crisis. So far, more than 800 voluntary commitments have been made to the **Water Action Agenda**,[18] a key outcome of the conference aimed at **accelerating progress towards achieving SDG 6**. The direct financial impact of the pledges is projected to surpass **$330 billion**, with the potential to leverage nearly **$1 trillion** worth of services for both humanity and the environment.[19]

Local and nature-based solutions to address the global water crisis

While water scarcity is an increasingly urgent global issue, it requires applying local, participatory, and resource-based approaches,[20] since underlying causes and specific challenges can vary significantly from one region to another. In addition, there has been a growing global recognition of the importance of **nature-based solutions**[21] as they hold the potential to contribute to the achievement of most of the SDG 6 targets[22] and provide approximately **30% of the cost-effective mitigation** required by 2030 to keep global warming well below 2°C.[23]

Nature-based solutions involve using nature to fix problems. For example, a village facing severe flooding might opt to plant a mangrove forest to protect the coastline, rather than a man-made flood barrier. Nature-based solutions encompass any actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience, and biodiversity benefits. Examples include tree planting, urban green spaces, constructed wetlands, bioswales, and more.

Protecting and restoring water-related ecosystems can enhance their capacity to regulate water flow and provide **natural buffers reducing the risk of extreme weather**. Nature-based solutions also **address social vulnerabilities**, by improving human health and well-being, enhancing food security, and providing green jobs in sectors related to ecosystem restoration and green infrastructure development.

ROLE OF THE TRAVEL & TOURISM SECTOR

The Travel & Tourism sector is one of the largest and fastest growing economic sectors. Its GDP is set to grow by 5.1% annually from 2023 until 2033, outpacing overall global economic growth (at 2.6% per year) and thereby playing a **pivotal role in driving socioeconomic development,** particularly in highly tourism-dependent destinations. Yet, its growing use of water resources poses significant challenges.

Even though the Travel & Tourism sector has relatively low freshwater use, it remains **heavily dependent on water and related ecosystems**[24] for a wide range of products and services. This includes obvious uses, like hotel swimming pools, as well as indirect uses such as growing crops for food or clothing. Consequently, water scarcity or poor quality can significantly harm the customer experience and pose a **threat to the viability of tourism destinations**.

As the impacts of climate change intensify, the sector finds itself even more vulnerable to water-related risks. Between 2015 and 2018, for example, prolonged drought in the City of Cape Town had a significant impact on the region's hospitality industry that led to a **$65 million loss in tourism revenue**.[25] The Travel & Tourism sector's water use can also raise ethical concerns, such as **water equity and environmental justice** since the concentration of water demand in specific locations and seasons might exacerbate water stress.

The remainder of this report **looks at water use in the Travel & Tourism sector** and explores challenges related to **strengthening its water resilience and adaptive capacity.** Furthermore, it **provides examples of best practices along with further guidance** to businesses on how to reduce their water footprint and strengthen resilience in water basins.

WATER USE IN TRAVEL & TOURISM

Water challenges have both a global and a local dimension. In this chapter, we analyse global and regional data on water use, water intensity and water stress using data provided by WTTC and the Ministry of Tourism of Saudi Arabia (KSA).

METHODOLOGY

Data collection and modelling approach

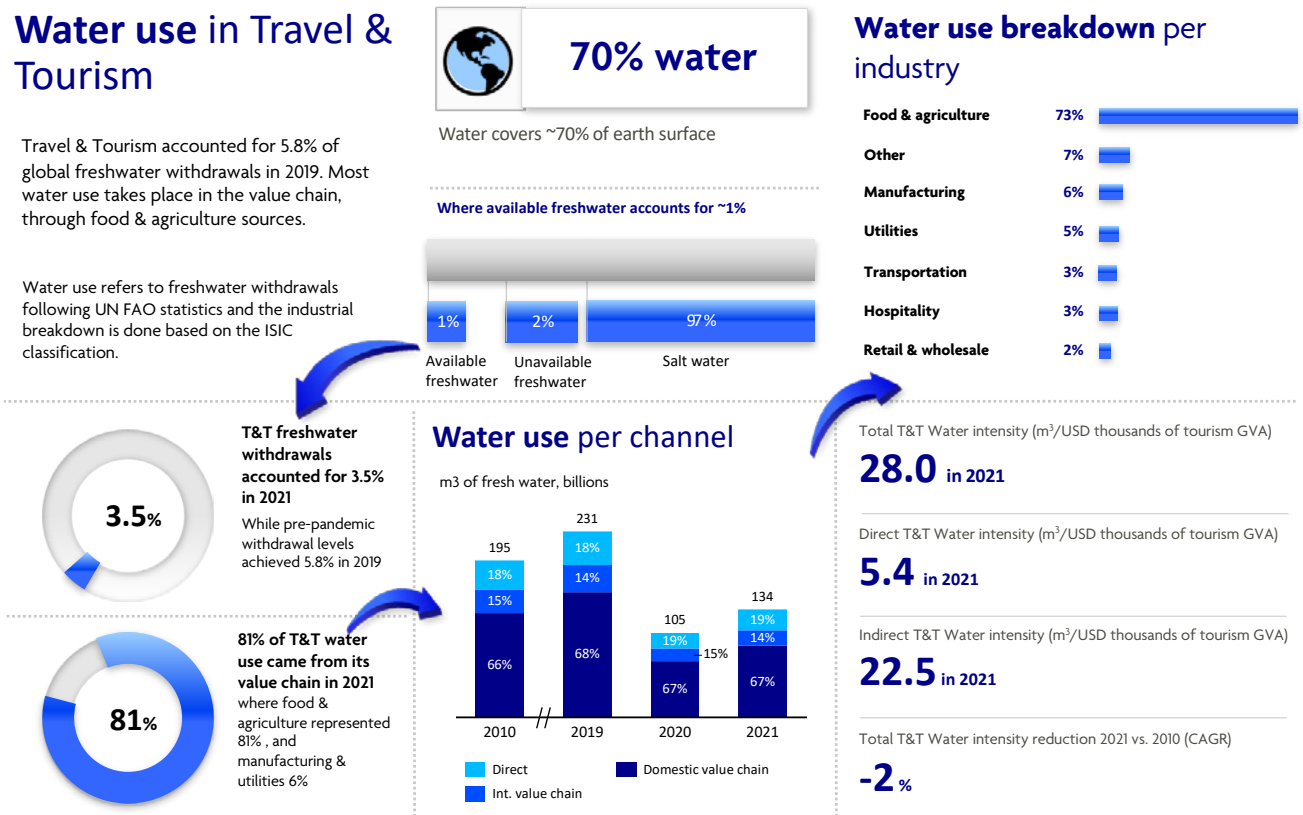
The methodology for WTTC's research, in partnership with the Ministry of Tourism of Saudi Arabia, into the environmental impact and resource footprint of Travel & Tourism was conducted by Oxford Economics and is explained in Appendix A. It details how water use (both direct and indirect) is measured and apportioned to economic sectors following the International Standard Industrial Classification (ISIC). It also provides further details on the water intensity calculation methodology as well as country specific income group categories.

GLOBAL FINDINGS

Water use

Water use refers to the **water drawn from renewable freshwater resources** (e.g. rivers, lakes, and groundwater) by human infrastructure. It also includes the direct use of non-conventional sources (e.g. treated wastewater, desalination), although this is relatively minor in most regions. It encompasses water delivered through public networks, as well as self-supplied (e.g. by agriculture, for irrigation and livestock). Data from the UN's Food and Agriculture Organization (FAO) is split into three main categories of water use: agriculture, industry, and municipal (i.e., domestic & service-sector industries). For the purpose of this report, these broad water categories are further split into more detailed ISIC (International Standard Industrial Classification) industries.

Figure 3: Infographic on water use in Travel & Tourism



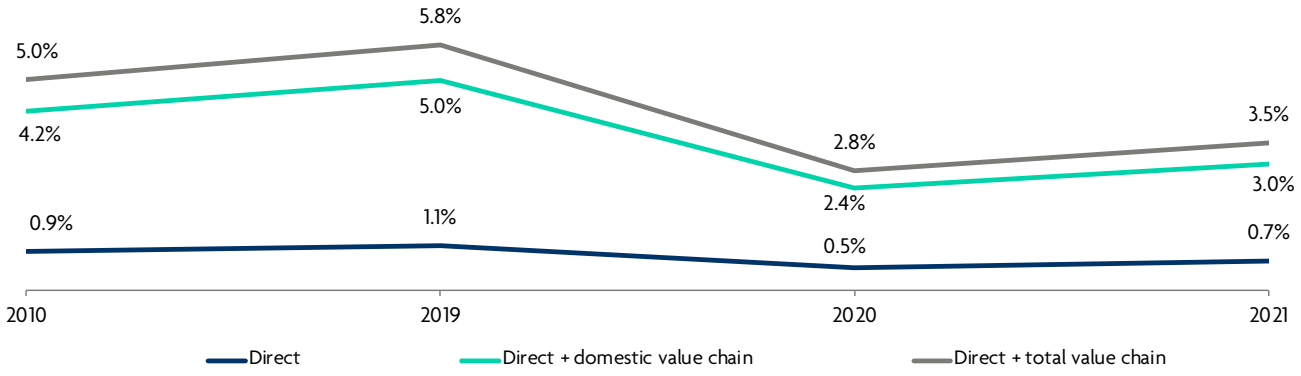
Source: Accenture based on WTTC and Ministry of Tourism of Saudi Arabia

Yearly freshwater withdrawals amount to around 3.9 trillion cubic metres of freshwater every year,[II] equivalent to one third of the volume of Lake Superior, or around 1.5 billion Olympic swimming pools.[III] Among all the industries that depend on water to operate, Travel & Tourism has a small share. In 2021, **the sector accounted for around 134 billion m³ or 3.5% of global freshwater withdrawals**, showing a decline of 1.5pp and 2.3pp from 2010 and 2019 levels, respectively (Figure 4). The latter can be attributed to the slower recovery of travel businesses from the COVID-19 pandemic, where 2020 reflected the lowest share.

As depicted in Figure 3, approximately **81% of the water used by Travel & Tourism-related businesses occurs indirectly through their value chain**. Among the different industries this sector touches, water embedded in **food and agriculture accounts for nearly three-quarters of the entire Travel & Tourism sector's freshwater use**, followed by other categories (e.g., entertainment, construction, telecommunication), manufacturing (e.g., clothing and accessories) and utilities representing 7%, 6% and 5%, respectively. **Transportation and hospitality combined account for just 6%.**

II Annual freshwater withdrawals' average from 2014 to 2019 according to the FAO (via World Bank).
III Assuming a volume of 2500 m³ for an Olympic size swimming pool.

Figure 4: Evolution of Travel & Tourism's share of total water use (% of global total)



Source: WTTC and Ministry of Tourism of Saudi Arabia

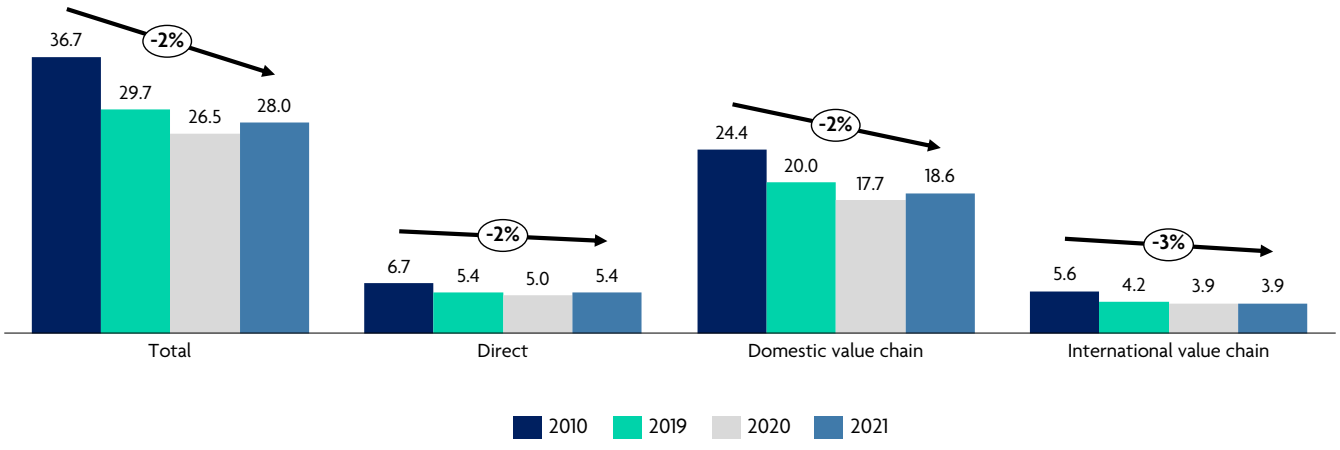
Water intensity

Water Intensity refers to water used per unit of value added per economic activity. Its unit of measurement is usually m^3 per USD

Global water intensity in Travel & Tourism has decreased across all channels over the past decade. As illustrated in Figure 5, the international value chain water intensity saw a bigger fall from 2010 to 2019 compared to the other channels. This might suggest that Travel & Tourism's imported products need less water to produce the same economic output, increasingly decoupling tourism growth from water use.

Figure 5: Travel & Tourism water intensity per channel from 2010 to 2021

m3 of tourism water use per USD thousand of direct and indirect Travel & Tourism GDP (2021 prices)



Source: WTTC and Ministry of Tourism of Saudi Arabia

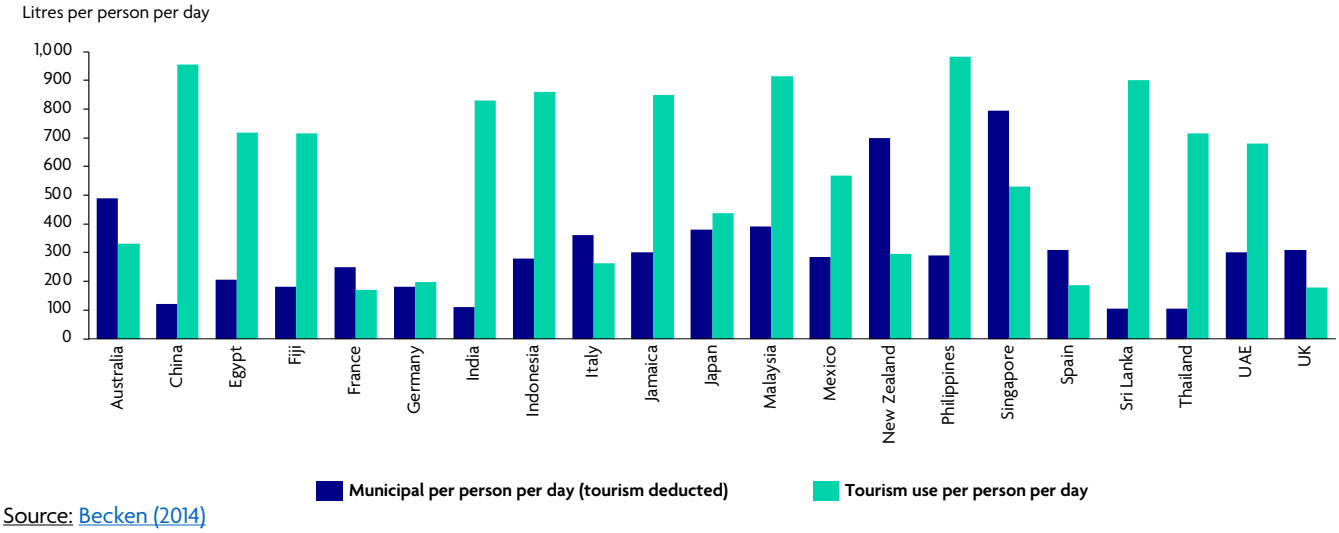
REGIONAL AND COUNTRY-SPECIFIC DIFFERENCES

Water use

While the sector's water use is relatively low compared to other industries, the picture becomes **more complex when examined at regional levels and country-specific levels**. Previous studies have shown that in certain Asian countries, a tourist can use anywhere from 1.5x to 8x more water than a resident on a daily basis (Figure 5).[26] However, in Europe, the situation is quite the opposite. For example, in the UK or Spain, a tourist uses only about half as much water as a local resident does.

According to the World Health Organization (WHO), between 50 and 100 litres of water per person per day are needed to ensure that most basic needs are met, while 175 litres per person per day is considered a realistic expectation for daily use.[27] However, in several parts of the world daily water consumption of **less than 40 litres per person is still common, which raises not only environmental but also ethical concerns** regarding the sector's water use, and considerations of water equity, environmental justice and the rights of marginalised communities. These observations convey an important message to Travel & Tourism businesses to help tourists review their water use practices, and **encourage water-conscious behavioural changes**.

Figure 6: Water use comparison between tourists and locals per country



Source: Becken (2014)
Note: Tourism use per person per day denotes the direct water use per guest per hotel night

The regions of Asia-Pacific, the Americas and the Middle East saw their Travel & Tourism water use increase from 2010 to 2019 (Figure 7). An upward trend in international tourist arrivals to those regions could have been the reason behind this (Figure 8), however Europe and Africa's cases offer a different perspective. These two continents saw a **yearly average increase in international tourist arrivals** of 5% and 4% respectively from 2010 to 2019, **but experienced a 1% yearly decline in water use** over the same timeframe. This reinforces the impression that further progress in reducing water use can be achieved by Travel & Tourism businesses.

Figure 7: T&T water use per region

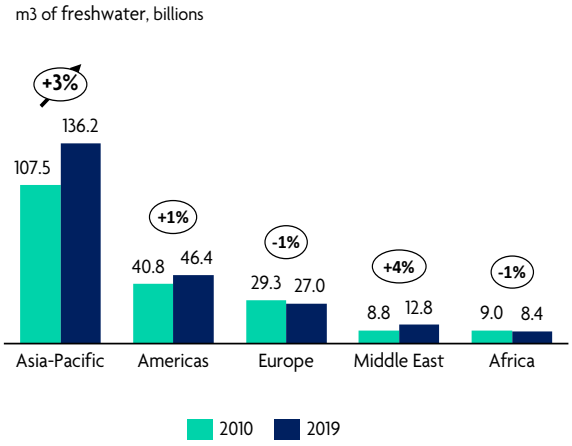
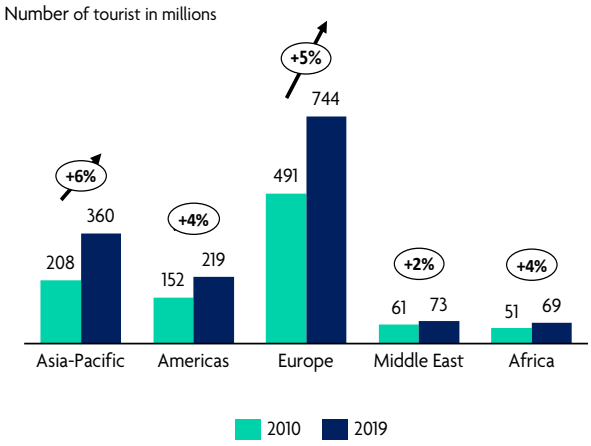


Figure 8: International tourist arrivals per region



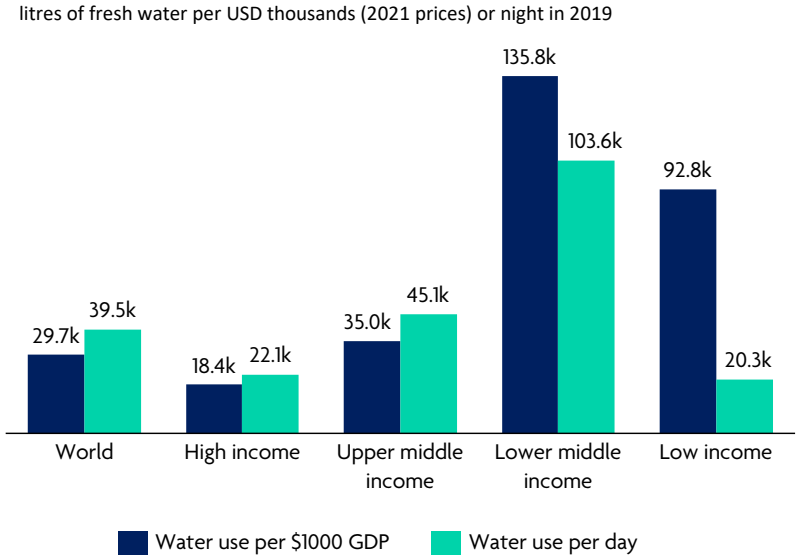
Source Figure 7: WTTC and Ministry of Tourism of Saudi Arabia

Source Figure 8: UNWTO via Statista 2023[28]

Water intensity

When analysing water intensity across income groups, there is a linear correlation between water use and GDP. As shown in Figure 9, **high-income nations exhibit lower water intensity compared to low-income ones**, suggesting that more developed countries may have already adopted water management policies and conservation practices.

Figure 9: Water intensity per income group and water use per night comparison



Source: WTTC and Ministry of Tourism of Saudi Arabia
Note: Income groups are defined by the World Bank country classifications depending on the Gross National Income per capita.
Water use per night refers to the water used through direct and indirect channels to sustain a person in destination for a day.

Water stress

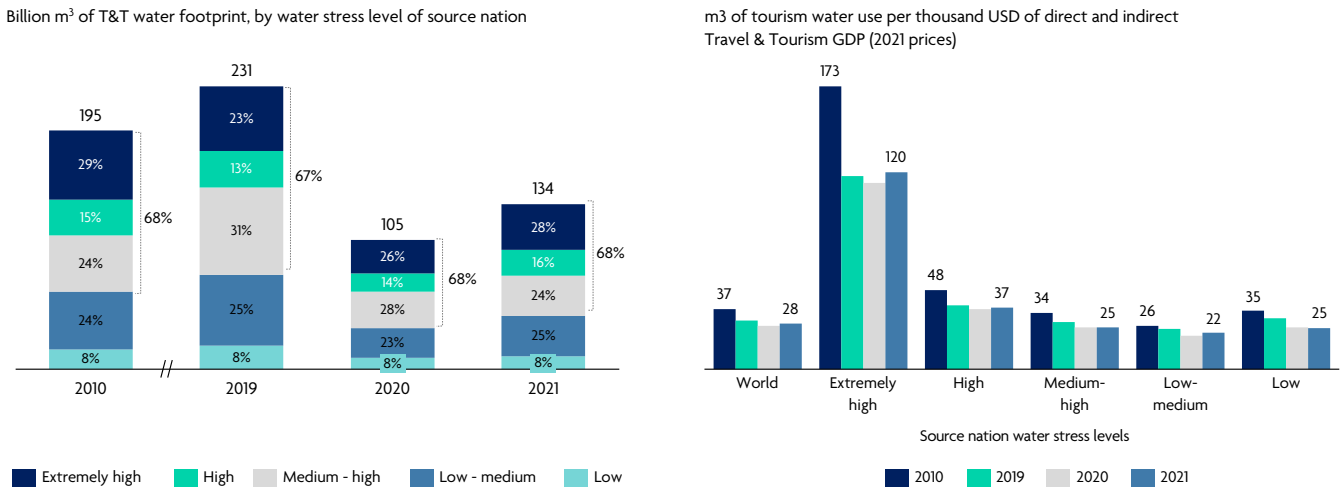
Baseline water stress refers to the ratio of water withdrawals compared to available renewable water supplies. Its unit of measurement is a percentage and the ratios are categorised in five water stress levels, according to the Aqueduct World Resources Institute (WRI) guidelines:

- Extremely High (>80%)
- High (40-80%)
- Medium-High (20-40%)
- Low-Medium (10-20%)
- Low (<10%)

Travel & Tourism is a global sector that operates in countries with varying degrees of water stress. Figure 10 shows that **68% of the sector's water demand comes from countries facing "extremely high", "high", and "medium-high" water stress levels**. Although this proportion has been relatively stable over the past 10 years, the coming decades may see a shift. According to the World Resources Institute (WRI), **25 countries are currently exposed to "extremely high" water stress annually, encompassing one-quarter of the world's population.**[29] However, projections suggest that by 2050, that number could be closer to 60%.[30]

In addition, the graphs below illustrate that **areas with high water stress correlate with higher Travel & Tourism water intensity**. This could be attributed to local agriculture practices, climate conditions, energy sources, and the availability and quality of water infrastructure, rather than being solely tied to tourist-related activities.

Figure 10: Travel & Tourism water demand and water intensity per water stress levels



Source: WTTC and Ministry of Tourism of Saudi Arabia

Conclusion

Based on a comprehensive review of freshwater use in the Travel & Tourism sector, the following conclusions can be drawn:

- Travel & Tourism represents a relatively small share of global water use compared to other industries. However, it is **highly reliant on food and agriculture products, meaning both businesses and governments must work to ensure** that local communities' water and food needs are not compromised by tourism activities.
- **Most Travel & Tourism activities occur in countries with "medium-high" to "extremely high" water stress levels** which correlates with high water intensity. This is likely to increase in the coming decades, as the list of nations facing "extremely high" water stress expands as a result of climate change.
- Even though global water use in Travel & Tourism increased from 2010 until 2019, in some regions **progress has been made to reduce the sector's water intensity, a critical step towards achieving SDG 6**.
- **Further progress in reducing water use can be achieved in the sector, as demonstrated by data from both Europe and Africa,** where water use has declined during the last 10 years, despite the rise in international tourist arrivals.

WATER-RELATED RISKS FOR TRAVEL & TOURISM

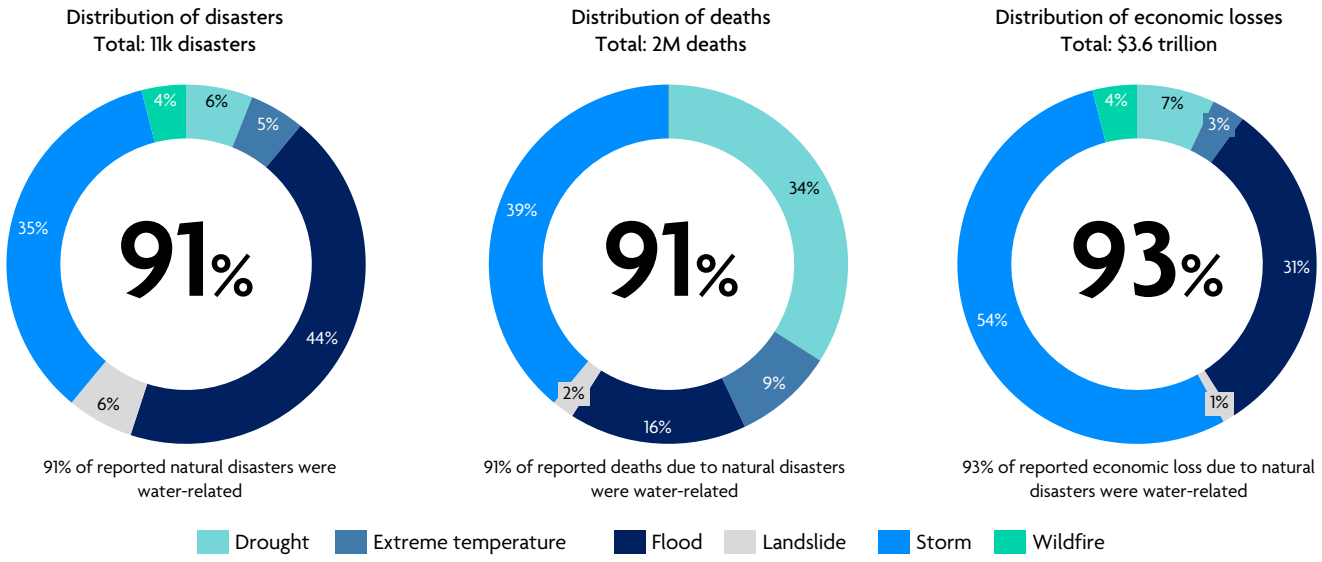
It is crucial to **strengthen the resilience and adaptative capacity** of the Travel & Tourism sector. The following chapter provides an overview of the current state of **water-related risk management** practices and offers insights into the sector's supply chain dynamics, in the quest for more resilient travel industries.

WHY RESILIENCE MATTERS IN TRAVEL & TOURISM

Tourism resilience refers to "successfully adapting to external shocks and crises in a way that results in a better prepared and more robust ecosystem in the future".[31] From a water risk perspective, building resilience is critical considering that **most of the reported disasters, deaths, and economic losses caused by natural hazards in the last 50 years have been attributed to severe water-related disasters (Figure 11)**.[32] Furthermore, climate change is increasing the likelihood of cascading effects of extreme weather events.[33] For example, intense storms have the potential to trigger floods and landslides, while prolonged periods of severe drought can lead to wildfires, compromised water quality, and water scarcity.[34]

The growing number of intense storms, combined with increased economic uncertainty and the emergence of new categories of risks[35] emphasises the importance for Travel & Tourism businesses to **proactively navigate risk** as a crucial step towards **building long term resilience.**

Figure 11: Distribution of reported disasters, deaths and economic loss by natural hazard type from 1970 to 2019

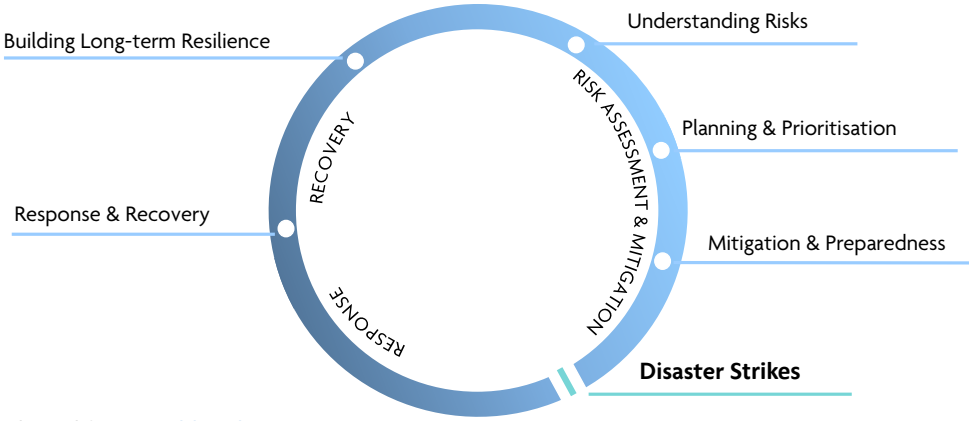


Source: Adapted from World Meteorlogical Organization (WMO)
Note: Droughts, floods, storms, and landslides are grouped as water-related hazards.

WATER-RELATED RISK MANAGEMENT AND DISCLOSURE

Building resilience is an ongoing effort that involves continuously monitoring threats, mitigating risks, developing effective response plans, learning from disruptions and implementing resilience strategies (Figure 12).[36]

Figure 12: Tourism Resilience Building Cycle



Source: Adapted from World Bank

Depending on their **vulnerability and level of exposure**, Travel & Tourism businesses may be confronted with a wide range of **physical and nature-related transition risks** (Figure 13), which can significantly impact their operations, leading to increased costs, disruption, reputational damage, and a diminished tourist experience.[37] [38]

Physical risks

Nature-related **physical risks** are a direct result of an organisation's dependence on natural resources and ecosystems. They are usually location-specific and can be categorised as either acute (e.g. event-based risks), chronic (e.g. longer term shifts), or both.

Transition risks

Nature-related **transition risks** are risks that result from a misalignment between an organisation and the changing regulatory, policy or societal landscape in which it operates.

Figure 13: Examples of water-related risks and their impact

Risk type	Risk category	Water-related risk	Potential impact on enterprise value
Physical risks	**Acute & chronic**	• Weather and climate extreme events, e.g., temperature rise, heavy precipitation, floods, and storms • Increased water scarcity and/or stress e.g., during peak travel seasons • Atmospheric rivers • Declining water quality	• Disrupted operations • Deteriorated customer experience • Additional costs and investments, e.g., water pre-treatment • Revenue loss • Reduced asset values
Transition risks	**Regulatory risks**	• More stringent regulatory frameworks and instruments to conserve water, e.g., water withdrawal and/or discharge permits and allocation • Mandatory water efficiency measures • Restrictions on pollutant types and levels • Abrupt increases in water tariffs and market instability	• Non-compliance with new regulations and possible fines, penalties, and legal expenses • Increased operating costs • Upfront costs to deploy new practices • Temporary disruptions and delays • Uncertainty impacting business planning and forecasting • Missed growth opportunities • Increased insurance premiums
	Reputation and market risks	• Growing stakeholder concerns • Tensions between businesses and local communities • Perceived or real inequities • Cultural values • Water-related diseases	• Damaged brand • Loss of company's license to operate • Potential lawsuits and settlements
	Technology risks	• Failures and malfunction of water-related technologies, including becoming less efficient or obsolete • Cybersecurity threats due to increased digitisation and automation • Data inaccuracies • Energy dependency • Aging or inadequate water infrastructure	• Increased maintenance and repair costs • Operational disruptions • Compliance challenges and penalties • Loss of stakeholder trust • Damage to the brand image • Hindered innovation • Write-offs and early retirement of existing assets

Source: CDP | WWF | UN Global Compact CEO Water Mandate | CERES | Accenture analysis

For example, the **financial sector is increasingly recognising the potentially material financial implications** of nature-related risks and has started **incorporating water-related risks into its guidance and risk assessments**.[39] Simultaneously, both voluntary and mandatory sustainability disclosure frameworks are placing increased emphasis on nature, including freshwater resources. Recent initiatives serve as examples of this growing focus and include the following:

- **Taskforce on Nature-related Financial Disclosures (TNFD)**[40] whose goal is to complement existing initiatives focused on reporting climate-related information.
- **Science Based Targets Network (SBTN)**[41] with a mission to equip companies as well as cities with the guidance for setting science-based targets for all of Earth's systems, addressing their impacts and dependencies on nature.
- The European Sustainability Reporting Standards (ESRS), underpinning the **EU Corporate Sustainability Reporting Directive (CSRD)**,[42] with specific focus on water-related aspects, as outlined in **ESRS E3 Water and Marine Resources**.[43]

Despite observing an **85% growth in CDP water disclosure over the past five years**, along with a 16% increase in 2022 alone, boardrooms have not fully **recognised the urgency of the water crisis and the potential of tapping into unconventional water resources, due to a lack of adequate economic incentives**[44] and a clear business case for water-relative initiatives.

TRAVEL & TOURISM VALUE CHAIN PERSPECTIVE

The Travel & Tourism sector relies on an extensive **network of organisations** including suppliers and intermediaries to provide products and services across a global value chain. The data presented in the previous chapter provides clear evidence that the **vast majority of the sector's global freshwater use occurs through its supply chain**.

As illustrated in Figure 14,[45] certain industries are more exposed to water-related risks than others. However, **the Travel & Tourism sector's unique characteristics make it highly vulnerable to water-related risks overall**. Considering that **food production and agriculture constitute 81% of the sector's indirect water use**, targeted interventions in these industries require the **most urgent attention**.

In addition, due to its close interconnections with other industries, **even small shifts towards circular and regenerative practices can catalyse changes across numerous public and private entities** beyond the direct and immediate impact of tourism activities.[46]

Figure 14: Material water-related risks exposure by industry (direct vs. indirect channels)

Selected GISC Industry	Operations (direct)		Supply chain (indirect)	
	Water Quantity	Water Quality	Water Quantity	Water Quality
Hotels, Restaurants & Leisure*	High	High	High	High
Beverages	High	High	High	High
Food Products**	Medium	Medium	High	High
Oil, Gas & Consumable Fuels	High	High	High	High
Construction Materials	High	High	Unclear or Low	Medium
Water Utilities	High	High	Unclear or Low	Unclear or Low
Electric Utilities	High	High	Unclear or Low	Unclear or Low
Energy Equipement & Services	High	High	Unclear or Low	Unclear or Low
Real Estate Mgmt. & Development	High	High	Unclear or Low	Unclear or Low

Source: Adapted from CERES (p.12)
Note: Based on the Sustainability Accounting Standards Board's (SASB) Materiality Mapping, combined with Ceres' and Investor Water Hub analysis and classification of risks (medium or high).
* Hotels, Restaurant & Leisure category includes Casinos & Gaming, Hotel, Resorts & Cruise Lines, Leisure Facilities and Restaurants.
**Food Products category includes Agricultural Products & Services and Packaged Food & Meats.

Conclusion

Building resilience and managing water-related risks are imperative for Travel & Tourism businesses due to the growing occurrence of extreme weather events, the sector's high dependency on freshwater, and rising stakeholder expectations.

- **Recognising interdependencies** and gaining an understanding of **supply chains** and broader **basin dynamics** are fundamental for sustainable water stewardship.
- **Assigning a monetary value to water-related risks** plays a pivotal role in securing **buy-in from the C-suite**, **prioritising water initiatives** and facilitating communication with stakeholders, in particular investors.
- Considering that **food production and agriculture constitute 81% of the sector's indirect water use**, targeted interventions in these industries require the most urgent attention.
- With the emergence of new and **interconnected risks**, there is a compelling need for **digital technologies to cope with added complexity**.

HOW TO REDUCE THE WATER FOOTPRINT AND ENHANCE WATER RESILIENCE

Many Travel & Tourism businesses have already embarked on a transformative journey towards becoming water-conscious and water-resilient organisations. This chapter highlights **examples within the sector** to not only inspire, but to **set a high benchmark for others**. It also introduces the **Water Management Action Framework** to offer additional guidance.

EXAMPLES OF BEST PRACTICE IN THE TRAVEL & TOURISM SECTOR

HOSPITALITY

Keywords: hospitality, Ecolab solutions, reduced water intensity, digital technology

Marriott International: With 31 distinct brands, Marriott International has a portfolio of nearly 8,600 properties spanning 139 countries and territories. Guided by its 2025 Sustainability and Social Impact Goals, as well as the UN SDGs, the company **commits to creating positive and sustainable impact wherever it does business.**

Each year, Marriott evaluates current and future water risks for the properties it owns, manages, and leases using the World Resources Institute (WRI) Aqueduct tool. In 2022, this assessment showed that approximately 42% of water withdrawals are from areas with "High," "Extremely High," or "Arid" baseline water stress. To address this and meet the company's 2025 Sustainability and Social Impact Goals, with a focus on **reducing water intensity by 15% from a 2016 baseline**, several initiatives were implemented throughout Marriott properties, including:

- The JW Marriott® Phoenix Desert Ridge Resort & Spa (Phoenix, Arizona, U.S.) replaced a large area of grass at the resort with turf, resulting in estimated water savings of approximately 5.7 million litres annually.
- Le Méridien® Maldives Resort & Spa (Maldives) was awarded the Green Mark GOLDPLUS award for the property's expansive sustainability efforts, which include a desalination plant that converts seawater into fresh drinking water.

Throughout 2022, Marriott expanded the company's water monitoring capabilities and significantly increased data compliance requirements with the Marriott Environmental Sustainability Hub (MESH) to meet the company's sustainability goals and reduce its environmental footprint. *Learn More*

HOSPITALITY

Keywords: hospitality, Ecolab solutions, reduced water intensity, digital technology

Six Senses: Operating 21 properties, the Six Senses brand (which since 2019 has been a part of InterContinental Hotels Group) is known for its focus on **wellness, sustainability, and enriching experiences**.

All Six Senses properties have established a **Sustainability Fund** dedicated to projects **benefiting local communities and ecosystems**. For example, in 2019, Six Senses Laamu launched the #ProtectMaldivesSeagrass campaign in a partnership with the resort's own marine biologists and the Blue Marine Foundation. The campaign convinced almost one third of all resorts in the Maldives to **protect over 974,000 m² of seagrass meadows** and gained an official endorsement from the Maldives Ministry of Tourism. Further research and efforts by the hotel in partnership with two more NGOs have led to the **designation of six Marine Protected Areas**.

Even though this example does not specifically address freshwater use, it aligns with the SDG 6.6 target and demonstrates that Travel & Tourism businesses can **inspire collective action to protect and restore water-related ecosystems**. While seagrass has been often considered a nuisance, it plays a vital role in stabilising ecosystems and building resilience to water-related risks by enhancing coastal protection. Seagrass also has the capacity to store carbon 35 times faster than rainforests,[78] contributing to climate mitigation.

For the past 16 years, Six Senses has also been **bottling its own water at each resort,** which eliminates the need for transportation and use of plastic water bottles. Where needed, this technology is shared beyond the hotels with the surrounding community. Inspired by Six Senses Laamu, **97 water filter stations have been installed** across Laamu Atoll, located in public buildings such as schools, mosques, council buildings and the local police station, **giving 5,998 people access to clean drinking water**. *Learn More*

AVIATION

Keywords: air travel, reduced water intensity, washing aircrafts, process innovation

Air France-KLM Group: Air France-KLM is one of the leading international airline groups, serving over 300 destinations through its network of airlines: Air France, KLM Royal Dutch Airlines, and Transavia. The group has found innovative ways **to reduce the water intensity of its aircraft and engine cleaning processes,** which account for most of the group's water use.

One example is the use of Ecoshine – an antistatic product developed by UUDS, which makes it harder for impurities to adhere to a plane's exterior. This reduces both the amount of water needed for each wash and the number of washes altogether, as the aircraft is kept clean for longer periods. The cleaner is non-toxic and **96% biodegradable,** and can be used with **recyclable pads rather than pressure washers,** increasing water efficiency further still.

The result is unequivocal: each wash uses up to **99% less water.** A Boeing 777 that previously took 12,000 litres of water to clean, for example, can now be washed with just 150 litres. This change has saved Air France-KLM **13 million litres of water over the past decade.** It has also helped the group to cut GHG emissions, as the planes no longer need to be towed to designated hangars for cleaning. *Learn More*

CRUISE

Keywords: : cruise line, wastewater treatment, reduced water intensity

Norwegian Cruise Line: Norwegian is the world's third-largest cruise line, operating brands such as Oceania Cruises and Regent Seven Seas Cruises, and visiting approximately 700 destinations globally. The company is continuously innovating and deploying new practices and technologies in support of its sustainability goals.

Norwegian aims to reduce its reliance on external water sources, particularly in high stress areas, and decrease **bunkering by 4% by 2025,** compared to 2019 levels. Every ship in the company's fleet is equipped with at least one reverse osmosis filter and steam evaporator, which turn seawater into freshwater. Through further upgrades and use of these technologies, the company achieved its target in 2022 of **producing 90% of freshwater onboard.**

The company also deploys numerous initiatives onboard to conserve water and reduce overall consumption. In 2020, Norwegian installed new water meters and plans to further expand the initiative to cover more locations. In parallel, various measures were implemented **to reduce water intensity, including a towel reuse program, water flow reducers installed on sink taps and shower heads, and the reuse of AC condensate for machinery, laundry, and deck washing**. As part of the company's policy to eliminate single-use plastic water bottles, purified water is offered across its fleet which has resulted in the elimination of over 20 million single-use plastic water bottles to date.

Norwegian is also well on track to meet its water quality targets of achieving **80% of wastewater treated before discharge and a 9% reduction in the total volume of sludge offloaded fleet-wide compared to 2018 levels.** To treat wastewater on board, all ships are equipped with **Advanced Wastewater Purification (AWP) systems** and **automatic stopping devices** to prevent bilge water discharge if it does not meet requirements, ensuring proper reprocessing or responsible landing ashore. The entire fleet is also equipped with ballast water treatment systems to prevent the spread of non-native species. Regular compliance checks and quality tests are conducted weekly by the vessel's Environmental Officer, in addition to quarterly tests and audits by third-parties. *Learn More*

DESTINATION

Keywords: : destinations, Spain, water digitalisation, water footprint

Spain and the city of Valencia: Spain, along with the entire Mediterranean region, is confronted with substantial water challenges and is particularly **vulnerable to the impacts of climate change.** In response, the country is actively involved in enhancing **water governance, modernising water infrastructure, and deploying innovative solutions** to effectively address its water-related challenges.

One example is the recently adopted Strategic Project for Economic Recovery and Transformation (PERTE), with a budget of approximately **$3 billion through 2026,** which focuses on the **digitalisation of water management.** The programme involves installing smart meters and using big data and advanced analytics, as well as monitoring water use with drone and satellite imagery. *Learn More*

As part of Valencia's Sustainable Tourism Strategy, the **water footprint of tourism has been quantified** to identify opportunities for advancing sustainable water management. The study showed that of total water use, only **16% was directly used by tourists,** primarily in tourist accommodation. The remaining **84% of water use was indirect consumption** related to the production of goods and services, and maintenance of attractions and entertainment venues. **Transport (public and rental cars) accounted for only 0.10% of tourism's water footprint.** *Learn More*

WATER MANAGEMENT ACTION FRAMEWORK

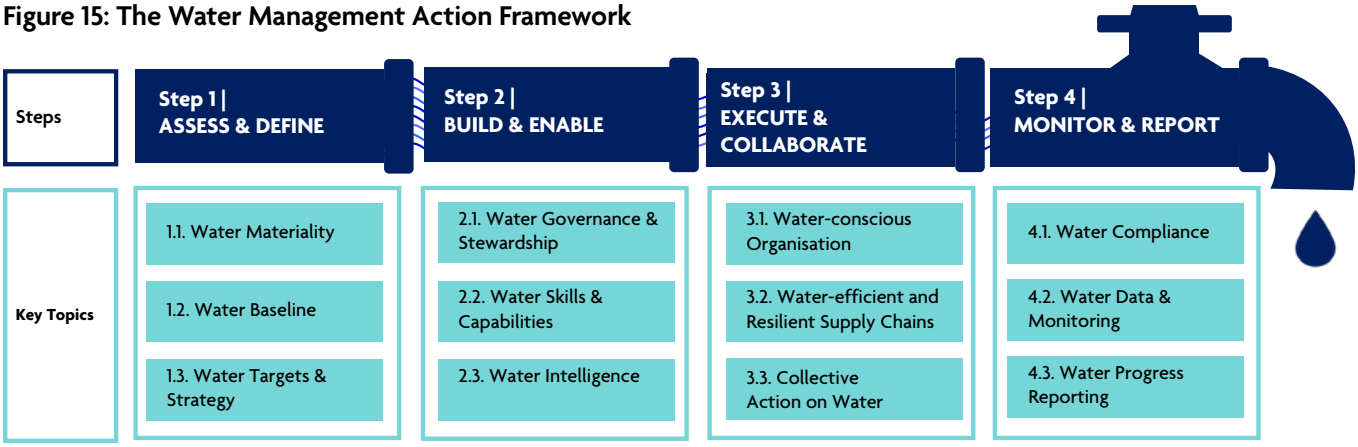
While there is no 'one-size fits all' solution, the following **Water Management Action Framework** (Figure 15) promotes a systematic and iterative approach to understanding and navigating highly complex water-related topics.

The Framework outlines four practical steps to:

- **Reduce the water footprint (direct and indirect)**, including water use, reuse, and discharge across the entire supply chain, and
- **Build or strengthen resilience to water-related risks** by managing material risks, preparing for, and responding to water-related emergencies.

Each step is accompanied by a range of detailed activities leading to measurable outcomes. The examples of water-related tools, including models, frameworks, and standards that can offer further support to Travel & Tourism businesses have been listed in Appendix B.

Figure 15: The Water Management Action Framework



Source: Accenture

Each company's **journey** is unique and starts from a different entry point, given varying vulnerabilities and exposure to water-related risks, levels of ambition, and the underlying local context. Therefore, businesses are encouraged to use the framework as a **starting point to reduce complexity, spark ideas,** and develop their **individual response to water challenges**, rather than as a set of prescribed measures.

Several **emerging practices** to reduce the sector's water footprint and build water resilience have been identified within this framework. These practices complement measures already implemented across the sector and are expected to **increase transparency and accountability**, **embrace a shared responsibility**, and **leverage nature-based solutions**. They can be further **enhanced by using digital technologies** to improve basin-wide planning and optimise water management strategies, including creating a market for water-related assets, reinforcing early warning systems, and more.

Finally, the Water Management Action Framework is designed to **complement the sector's efforts to reach net-zero emissions**[47] by **shifting towards circular and regenerative practices** to **catalyse change and drive water excellence** across supply chains and water basins.

STEP 1.

ASSESS & DEFINE

Overall Objective:

Understand the context, prioritise measures and gain the board's buy-in for water-related initiatives.

Key Challenges:

- How to model complex interdependencies with the limited data available.
- How to assign monetary value to intangible benefits and demonstrate the feasibility of water-related initiatives.
- How to account for uncertainties and balance short-term and long-term objectives.

KEY ACTIVITIES:

1.1
Water Materiality
- Identify water-related dependencies and impacts
- Determine financially material water-related risks and opportunities
- Pinpoint priority geo-locations, business units, and sections of the supply chain

1.2
Water Baseline
- Quantify the water footprint
- Understand vulnerabilities and evaluate water resilience maturity level
- Select a modelling approach and establish baseline values

1.3
Water Targets & Strategy
- Set and disclose water targets
- Prioritise measures and formulate a water reduction & resilience action plan
- Develop a compelling business case for water-related initiatives and secure funding

1.1. Water Materiality

Becoming a water-conscious organisation starts with **understanding where you interact with nature**. This can be achieved by listing and evaluating your **water-related dependencies and impacts** (positive or negative) both within your business and along the supply chain. To assess and prioritise **water-related risks and opportunities**, the **double materiality principle** should be applied. Examining the extent to which a company's direct and indirect water use affects ecosystems and people, as well as **determining financially material water-related risks and opportunities** will help Travel & Tourism businesses pinpoint priority locations, business units, and sections of the supply chain that **require the most urgent attention**. Frameworks and tools to support your water materiality assessment can be found in Appendix B.

1.2. Water Baseline

Alongside the water materiality assessment, both the direct and indirect **water footprint** should be calculated. This will allow Travel & Tourism businesses to identify areas of **high water use**, detect potential leaks and anomalies, as well as unlock **opportunities to increase water efficiency and promote conservation efforts within their own operations and along supply chains**.

This process will help businesses better understand their **vulnerabilities and level of exposure to water-related risks**, as well as determine their **water resilience maturity level**. This includes evaluating potential impacts on **water availability and quality** along with the **resilience of the infrastructure** and the effectiveness of **emergency response scenarios**.

To establish a baseline, Travel & Tourism businesses should **select a modelling approach** based on the available data and the characteristics of the water resource system, such as rainfall–runoff relation, green and grey infrastructure, and the degree of urbanisation. There are several ways to **validate the accuracy of the model**, including external experts' input, benchmarking against industry best practices, and performing sensitivity analyses. Additional tools can be found in Appendix B.

1.3. Water Targets and Strategy

Once the company gains a clear understanding of its water context, it should establish time-bound water targets using **a science-based approach** (e.g. the SBTN pilot framework)[48] **and considering local settings**. In addition to the SBTN framework, Travel & Tourism businesses can use guides developed by the UN Global Compact CEO Water Mandate (Appendix B). As part of the target setting process, it is strongly recommended to connect with key basin **stakeholders to obtain valuable feedback and initiate basin-wide collaboration**.

It is also advised to **engage C-level executives** early in the process. To secure the board's buy-in, a **compelling business case and narrative** should be developed. This might include setting an **internal price on water to reflect its true value**[49] if appropriate.

Given **uncertainties** related to climate change and the **high complexity** of water-related topics, any water reduction & resilience action plan should be **periodically reviewed.**

Key Outcomes:

- **Prioritisation of water-related goals and metrics**
- **Deeper understanding of the concerns and expectations of stakeholders**
- **Board level guidance and support**

STEP 2.

BUILD & ENABLE

Overall Objective:

Establish a clear governance structure and build capacity to achieve water targets.

Key Challenges:

- How to align water-related topics with other sustainability goals and priorities.
- How to maintain effective communication and overcome resistance to change.
- How to stay attuned and agile to changing regulatory and market dynamics.

KEY ACTIVITIES:

2.1
Water Governance & Stewardship
- Communicate the benefits of becoming a water conscious organisation
- Integrate water-related risks and opportunities into business processes
- Launch a pilot project to test ideas and build momentum

2.2
Water Skills & Capabilities
- Mobilise the team and set clear expectations
- Determine the extent of the skills gap
- Implement training and development initiatives

2.3
Water Intelligence
- Leverage data insights to establish real-time control and reaction to water-related risks
- Identify and assess emerging technologies
- Monitor market trends and water-related industry best practices

2.1. Water Governance & Stewardship

To build a shared vision and a collective effort to become a water-conscious organisation, it is essential to **effectively communicate the benefits** of embedding water-related efforts into business strategy and day-to-day operations. It is also crucial to ensure **clear governance and accountability** within the organisation and along supply chains, e.g. by nominating a **Water Focal Point**[IV] **and a dedicated team** to oversee the project.

Obtaining a **comprehensive and transparent view of water-related topics** can be challenging, even within a single entity. Keeping track of data might require access to a patchwork of different teams and operating systems. To fully integrate water efforts, particularly into an **Enterprise Risk Management** (ERM), it is essential to break down silos and have an overarching plan across the organisation, encompassing all systems, business units, and geographies.

It's also worth **launching a pilot project to test ideas and build momentum.** The goal of this pilot scheme should be to target and achieve **quick wins to demonstrate feasibility** and **increase enthusiasm** for water-related initiatives, e.g. by fixing leaks, upgrading to low-flow fixtures, or adopting rainwater harvesting and drip irrigation systems. For example, implementing an **on-site wastewater recycling laundry system** can help Travel & Tourism businesses use up to **70% less water than traditional laundry systems**.[50] Furthermore, introducing towel and linen reuse initiatives, along with the adoption of sustainable laundry practices can prolong the lifespan of textiles. This, in turn, can make a significant difference, given the textile industry's substantial water usage and environmental impact.[51]

IV The role of a Water Focal Point, whether situated within or outside the sustainability team, is to coordinate water-related efforts.

2.2. Water Skills & Capabilities

To mobilise your team, it is important to set **clear expectations** and assign roles based on individual strengths. Conducting regular performance reviews will allow businesses to determine the **extent of their skills gap** and lay the foundation for implementing **training and development programmes** needed to build confidence to scale-up efforts. Given the high complexity of water-related topics, **cross-functional collaboration** should be encouraged to foster knowledge sharing and align teams within the organisation.

2.3. Water Intelligence

As highlighted earlier, becoming a water-conscious organisation requires **collecting data** to monitor water basins, forecast water availability and quality, detect usage peaks and anomalies, and recognise known and unknown water-related hazards.

Using earth observation and remote sensing technologies along with **artificial intelligence, machine learning and data analytics** can help Travel & Tourism businesses anticipate threats, identify risk patterns, and ensure **near real time control** and reaction to financially material water-related risks and opportunities. This includes implementing **automated and less error-prone processes** informing natural disaster risk modelling and reinforcing emergency management.

Building **water intelligence capabilities** can also help Travel & Tourism businesses better understand and influence customer behaviour and **stay attuned** to changing business dynamics. It is also imperative to **unlock links between water- and carbon-related capabilities** to better understand and navigate complex and interconnected risks and opportunities.

Key Outcomes:

- **Enhanced performance on water-related topics**
- **Prioritisation of skill and knowledge needs**
- **Strategic agility, speed, and efficiency**

STEP 3.

EXECUTE & COLLABORATE

Overall Objective:

Catalyse change and drive water excellence across supply chains and water basins.

Key Challenges:

- How to integrate new solutions with existing processes and systems.
- How to address the gap between what customers say they want, and what they are prepared to spend money on in practice.
- How to navigate the balance between public interest and business viability.

KEY ACTIVITIES:

3.1
Water-concious Organisation
- Deploy cost-effective, feasible, and fit for purpose solutions
- Implement measures to prepare for, and respond to water-related emergencies
- Raise awareness and encourage behavioural change

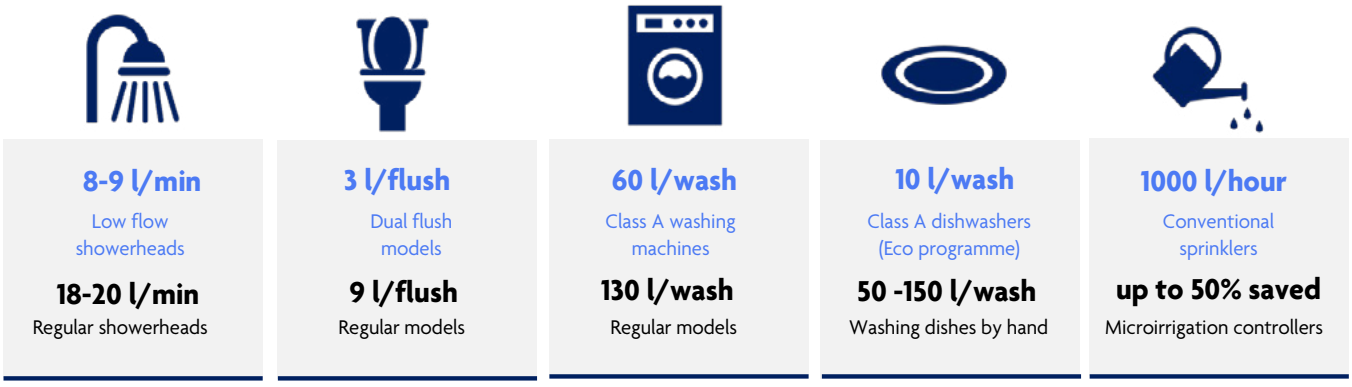
3.2
Water-efficient and Resilient Supply Chains
- Develop a code of conduct and guidance to catalyse change
- Increase traceability of water and incentivise water-efficiency
- Encourage suppliers to apply industry best practices and pursue certification

3.3
Collective Action on Water
- Protect and restore water-related ecosystems
- Invest in nature-based solutions
- Implement Water, Sanitation and Hygiene (WASH) initiatives

3.1. Water-conscious Organisation

To achieve their water targets, Travel & Tourism businesses have a broad range of solutions to choose from, including established practices such as **fixing water leaks**, **installing aerators**, **low-flow fixtures and high-efficiency appliances (Figure 16),**[52] **opting for push button or sensor taps and showers, and employing premixed hot water systems.**

Figure 16: The potential of low-flow fixtures and high-efficiency appliances to conserve water



Source: Adapted from EEA (p.61), Waterwise (relating to above infographic on Conventional Sprinklers), US EPA (last image on microirrigation for reduction %)

Another example is sustainable landscaping, including planting **native and drought-tolerant plants**, mulching, using compost to help retain moisture in the soil, and **rainwater harvesting**. As Travel & Tourism businesses progress in their water stewardship efforts, they can begin adopting emerging approaches too. These prioritise **increased transparency and accountability**, foster **shared responsibility**, and leverage **nature-based solutions** – such as green infrastructure – to build water resilience. **Circular and regenerative practices** should be recognised, considering their potential not only to decrease the water footprint of Travel & Tourism businesses but also to play a pivotal role in achieving net-zero commitments by 2050. These practices should be accompanied by measures aimed at **raising awareness and encouraging behavioural change**, including incentivising water saving habits.

3.2. Water-efficient and Resilient Supply Chains

Given the vast majority (81%) of the Travel & Tourism sector's global freshwater use occurs indirectly through its value chains, collaboration with suppliers is vital. **Food constitutes a significant portion of the total water use per tourist per day**, especially for water-intensive products such as cheese, nuts, farmed seafood, and meat. Companies should therefore work to prevent food waste and collaborate with local farmers to encourage **water-efficient and regenerative agriculture practices** and **smart irrigation systems**.

One proven strategy is to develop a supplier code of conduct. This document can define your **core values and clear expectations** allowing Travel & Tourism businesses to establish a level playing field and **drive water excellence** along their supply chains. The code of conduct might include specific guidelines, best practices, and standards providing a basis for **monitoring compliance** and **favouring suppliers** who **prioritise sustainable water management practices**. Additional tools can be found in Appendix B.

This will also allow Travel & Tourism businesses to **develop new**, **water-conscious tourism products and practices**. However, companies should be wary of the discrepancy between customers' declarations and their purchasing decisions – the so-called "**sustainability say-do gap".**[53] Navigating this discrepancy requires a shift in business logic that prioritises an **innovative and collaborative approach within the supply chain**.[54]

It is also vital to increase **transparency and accountability** by ensuring that all environmental claims and statements are backed up with evidence, using third-party certification, and **educating customers to make informed choices**. Digital technologies can help companies to trace the origin **of their water supply**, leading to more accurate measurements and optimised water use along the supply chain.

3.3. Collective Action on Water

As companies mature in their water management practices, they start to assess the **broader context of the water basin** in which they operate and engage in **collective action with stakeholders**.[55] One example is the **Forward Faster** platform[56] and its Water Resilience target, recently launched by the UN Global Compact. The initiative aims to guide companies and leverage the efforts of the UN Global Compact CEO Water Mandate Resilience Coalition[57] in order to achieve **Net Positive Water Impact (NPWI) in 100 water-stressed basins worldwide**. By delivering NPWI, companies not only reduce water use and build resilience in their own operations and supply chains, but also **benefit the surrounding communities and ecosystems**.

Adopting the NPWI approach can help the Travel & Tourism sector demonstrate its environmental leadership and **strengthen destinations' resilience to water-related risks.** Leadership in this area can be achieved by addressing the most urgent challenges and vulnerabilities, promoting an **integrated approach to water resource management**, including supporting **local water conservation efforts**, developing **resilient water infrastructure** (both green and grey), engaging in **shared research and monitoring**, and improving access to clean **Water, Sanitation, and Hygiene (WASH)** services.[58] One of the WASH initiatives worth considering is Clean the World's Hospitality Recycling Program, which allows you to conveniently review, track, and share results on a dedicated impact dashboard.[59]

While nature-based solutions may require **extensive planning and permitting**,[60] the **potential of Public-Private Partnerships (PPP) should also be explored** as a means of paving the way for a large-scale collective action in water basins (see Appendix B). International organisations, governments, water management agencies, and basin authorities need to take bold action to eliminate barriers, mobilise finances, and implement reforms required to enforce integrated water resources management processes. Through concerted efforts, they can address the most urgent water challenges and drive impactful change on both a global and local level.

Key Outcomes:

- **Water efficiency and increased emergency preparedness**
- **Supply chain optimisation and resilience**
- **Positive impact on communities and ecosystem**

STEP 4.

MONITOR & REPORT PROGRESS

Overall Objective:

Provide stakeholders with reliable and relevant information on water targets, risks and opportunities.

Key Challenges:

- How to determine which metrics and indicators are the most relevant to stakeholders.
- How to ensure data accuracy and availability.
- How to present complex data and insights in an understandable way.

KEY ACTIVITIES:

4.1
Water Compliance
- Understand obligatory requirements related to water use and resilience
- Establish a monitoring and reporting mechanism
- Conduct regular internal audits

4.2
Water Data & Monitoring
- Identify quantitative and qualitative water-related data points
- Leverage technology and automation
- Collect data and measure water-related KPIs

4.3
Water Progress Reporting
- Align with relevant frameworks, standards and broader corporate sustainability goals, including UN SDGs
- Provide third-party assurance
- Establish feedback loops and drive continuous improvement

4.1. Water Compliance

To ensure that Travel & Tourism businesses **adhere to water-related regulatory requirements**, the relevant compliance mechanism should be established to understand the regulatory landscape and proactively monitor and mitigate regulatory risks, including potential penalties within the organisation and along its supply chains. This effort also includes maintaining a **trail of documentation** and conducting regular **internal audits** to identify potential risks of non-compliance and areas for improvement.

4.2. Water Data & Monitoring

To effectively monitor and report progress towards established water targets, joint efforts within the entire value chain are essential to **collect and share accurate water-related data**. Collaboration with suppliers and stakeholders across the **value chain and the water basin** also allows organisations to identify data gaps and inconsistencies and further **align approaches and methodologies** with industry best practice. Additional tools can be found in Appendix B.

4.3. Water Progress Reporting

Reducing water use and managing water-related risks and opportunities can play a significant role in **climate change mitigation and adaptation.** These efforts can also contribute to **circularity objectives**, and should therefore be **integrated with** broader corporate **sustainability reporting frameworks and standards**, including the **UN SDGs** (see Appendix B).

While preparing water-related disclosures, whether voluntary or mandatory, it is important to accurately determine the **scope and boundaries** of reporting. Companies should undergo a rigorous **internal review** process or **third-party assurance** (mandatory for the companies that fall within the scope of the EU CSRD) to ensure **accuracy and credibility** of the disclosed data.

Sharing water-related data and insights demonstrates the commitment of the Travel & Tourism sector to water stewardship and can inspire others to adopt circular and regenerative practices. Stakeholder feedback should be used on a regular basis to **refine the process and drive continuous improvement**.

Key Outcomes:

- **Increased transparency and accountability**
- **Evidence-based decision-making**
- **Performance benchmarking**

HOW DIGITAL TECHNOLOGIES CAN HELP

Emerging technologies, ranging from the sharing economy to the Internet of Things (IoT), autonomous vehicles, blockchain, and artificial intelligence (AI) present a **wide range of opportunities for destinations and travellers** worldwide.[61] However, a **thorough assessment** should be conducted to identify technology that is fit-for-purpose and compatible with existing systems. Companies should also assess the cost of deployment and identify risks such as data security and privacy concerns. The **environmental impact** of digital technology should also be addressed, following recommendations by the Green Software Foundation.[62]

Digital technologies:

- **AI/ML:** AI and machine learning (ML) can be used to analyse historical data, weather patterns, tourist arrivals, and other relevant factors to predict water demand, optimise water conservation efforts, and build water resilience. One example is the Google Flood Forecasting Initiative. Its 'Flood Hub' platform displays flood forecasts, enabling governments, aid organisations and at-risk communities to take timely action.[63] As technology evolves, AI and ML are becoming **integral for other systems and applications**. It is therefore important to incorporate **"responsible by design"**[64] principles early in the process to ensure that solutions developed by Travel & Tourism businesses mitigate potential biases, and uphold ethical standards by promoting fairness, transparency and accountability.
- **Smart Sensors and IoT:** Smart sensors can be installed in buildings, manufacturing plants, and other facilities to **monitor water quality and use**, e.g. to detect leaks or other anomalies. An illustrative use case is the initiative led by charity: water in northern Ethiopia, in which 3,000 first-generation **cloud-connected IoT sensors** were installed on water points to track performance and **remotely monitor the functionality of clean water**.[65]
- **Blockchain:** Several case studies have demonstrated that **the integration of blockchain and IoT sensors** can strengthen water security and promote sustainable and transparent water management practices.[66] By using blockchain, organisations can **track and record water use data** from various sources, increase trust, and create new markets for water-related assets, e.g. **water quality credits** or **wastewater cap-and-trade schemes**.[67] One example involves a collaboration between IBM Research, SweetSense Inc., and the Freshwater Trust. The group has developed a **pilot technology that can monitor and track the use of groundwater** in real time along the delta of the San Joaquin River, one of the largest and most at-risk aquifers in North America.[68]
- **Earth Observation and Remote Sensing analytics:** These technologies can play a vital role in **monitoring water basins** to predict water availability and quality. They can also increase the accuracy of threat modelling and **enhance early-warning mechanisms** and emergency management by combining data sets on nature-related risks and climate change risks, which are often managed in isolation.
- **Digital Twin:** Digital twin technology is being used to create **virtual replicas** of water systems. These replicas enable users to simulate and monitor processes, assess vulnerabilities, mitigate disruptions, and optimise performance. One example is a model developed by ARUP[69] that uses **sensors across the catchment area along with AI/ML to manage flood risks in real time**.
- **Extended Reality (XR):** XR platforms can be integrated with IoT devices and sensors to visualise data, as well as prototype and test solutions **without the need for physical resources**. This can significantly reduce both the cost and environmental impact of new ventures. XR can also be used for **immersive training and virtual simulations** to **educate and inspire behavioural change**, e.g. teaching new irrigation techniques. With the growing popularity of XR in entertainment, there is also potential for Travel & Tourism businesses to develop tools that **inspire travellers to become more aware of the water crisis** in new and captivating ways.[70]
- **Metaverse:** By creating **immersive experiences**, the metaverse can – in some instances – reduce or even eliminate the need for physical travel, unlocking opportunities to make the Travel & Tourism sector more **inclusive and sustainable**, e.g. by allowing disabled travellers to overcome physical barriers. It also offers a platform to raise awareness about the water crisis. One example is the world's first 'Digital Nation' concept developed by the Pacific island nation of Tuvalu, to recreate itself digitally and continue working as a state even after being submerged by rising sea levels.[71] While some Travel & Tourism businesses are already actively **developing metaverse communities**,[72] it is crucial to **integrate environmental considerations** and capitalise on the metaverse's potential from the outset.

Water-related, tech-enabled solutions:

- **Smart irrigation systems:** Modern satellite imagery and weather predictions, combined with IoT sensors and AI/ML, can support **more precise and informed irrigation decisions**.[73] However, it is important to recognise that even small-scale solutions, such as timers or drip irrigation systems, have the potential to bring about substantial change.
- **Water harvesting and recycling systems:** Water harvesting and recycling systems using smart sensors, IoT frameworks and data analytics can be installed in buildings and manufacturing plants to **capture moisture and rainwater, as well as recycling greywater for non-potable uses** such as landscaping or cooling. There is also a growing interest in the development of **atmospheric water harvesting technologies** to produce potable water from ambient air, as both emergency and long-term supply solutions.[74]
- **Cloud-based water management software:** Cloud-based software can be used to monitor water use across multiple locations supporting businesses in **tracking progress towards their water-related targets**. For example, the recent collaboration between Microsoft and Ecolab added new capabilities in Microsoft Cloud for Sustainability. The purpose-built water data model provides a **single source of truth** through multi-source data acquisition, allowing organisations to **overcome water accounting challenges, track compliance** with reporting requirements, and **generate custom reports**.[75] Another practical application of cloud technology is the collaboration between Ecopetrol, Amazon Web Services (AWS) and Accenture to develop a water intelligence and management platform that allows users to **share data and promote water reuse within and between industries**.[76]

CONCLUSION AND A CALL TO ACTION

CONCLUSION

In spite of the growing worldwide recognition of the urgent water crisis, **water-related challenges have not yet been fully acknowledged.** Most companies are leaning towards decarbonisation initiatives and meeting net zero commitments – which, in turn, are often driven by legislative mandates. As emphasised in this report, **water and carbon footprints are intricately interconnected**. Therefore, adopting circular and regenerative practices and building water resilience can further support the Travel & Tourism sector's climate change adaptation and mitigation efforts.

The water intensity of the Travel & Tourism sector is determined by various factors, such as local agriculture practices, geographic location, climate conditions, the availability and quality of water infrastructure, and energy sources. With **agriculture and the food industry** significantly contributing to overall freshwater use in the Travel & Tourism sector, these interdependencies **should be further explored**.

As **water scarcity, pollution, and weather emergencies** can lead to severe consequences, including increased operational costs, disruptions in supply chains, and reputational risks, taking **proactive steps to address water challenges is imperative for the Travel & Tourism sector**. While each company's journey is unique, we have introduced examples of **innovative approaches and best practice** alongside a tailored **Water Management Action Framework** to inspire and guide Travel & Tourism businesses as they navigate their way to long-term sustainability and resilience.

Digital technologies can play a pivotal role in water stewardship efforts. However, a thorough assessment is needed to **address security, privacy, and environmental concerns**, as well as other risks associated with the deployment of emerging technologies.

Finally, while collective efforts to address water crises are needed, it is also crucial to recognise the **economic significance of the Travel & Tourism sector**, particularly in **highly tourism-dependent destinations**. Protecting and restoring water-related ecosystems, reusing wastewater, and investing in nature-based solutions are seen as **efficient and cost-effective approaches** to regulate water flow, as well as purify, protect, and enhance freshwater availability in water basins. These actions can also **directly benefit local communities**, by providing opportunities for **green job creation and capacity building**.[77]

CALL TO ACTION

Travel & Tourism businesses:

The actions highlighted below are crucial to **catalyse change and drive water excellence** across Travel & Tourism businesses, their supply chains, and water basins.

1. **Understand your impact and set time-bound and science-based water targets**

- ✓ Use approaches validated by science, such as the SBTN and TNFD frameworks and guidelines developed by the UN Global Compact CEO Water Mandate, Global Wastewater Initiative, World Water Quality Alliance
- ✓ Focus on reducing your water footprint in high water stress areas and the most water-intensive business units
- ✓ Address urgent water-related risks that affect local communities, ecosystems and the overall enterprise value

2. Prioritise water-related initiatives and build internal capabilities

✓ Appoint a Water Focal Point and a dedicated team to drive a water-specific agenda and ensure buy-in from your C-suite
✓ Build in-house water management expertise and request external support when needed
✓ Foster innovation and use technology to implement water reduction & resilience action plans

3. Fund water reduction and risk mitigation initiatives

✓ Understand your financial needs and develop cost-efficient initiatives to achieve water targets and build resilience to water-related risks
✓ Implement water initiatives along your supply chain, prioritising the most water-intensive industries, such as agriculture and food production
✓ Offer innovative, water-conscious products and services, and incentivise water-saving habits

4. Participate in collaborative water-related actions within and across industries

✓ Join industry-led initiatives addressing water challenges, such as the UN's Water Resilience Coalition
✓ Support local water conservation efforts and maintain an ongoing dialogue with local entities and organisations, including key basin stakeholders
✓ Get involved in inter- and cross-sectoral dialogues to learn from others, get access to the latest technological developments, and explore potential partnerships, including PPP

5. Monitor and report your progress

✓ Ensure compliance with water-related regulations, and where needed, raise the level of ambition among Travel & Tourism businesses
✓ Communicate progress towards achieving established water targets and disclose water-related risks and opportunities
✓ Share best practices and lessons learned to inspire water stewardship efforts

Public Sector:

In addition to businesses, **greater support from national and local governments, regulators, water management agencies, and basin authorities is required** to encourage and facilitate collective action in water basins. This includes, among others, undertaking measures to:

- Foster cross-sectoral collaboration between key basin stakeholder groups,
- Reduce red tape and encourage the formation of PPP,
- Create a market for water-related assets,
- Establish water funds and water sharing agreements,
- Support the reuse of wastewater, e.g., through cap-and-trade schemes,
- Provide local, water-related green jobs opportunities,
- Share data and reinforce early warning systems,
- Raise awareness and empower people to act.

WTTC commitment:

As the leading voice of the global private sector of Travel & Tourism, WTTC will continue to support the sector's sustainable water stewardship efforts by **providing data, sharing best practice and proven methodologies** to address water challenges. We will also examine innovative approaches and initiatives to **embrace a sense of shared responsibility for water resources and inspire further collaboration** (e.g. through water-conscious hubs and clusters, local markets for water-related assets, and water offsetting).

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The Voice of Travel & Tourism.

WTTC promotes sustainable growth for the Travel & Tourism sector, working with governments and international institutions. Council Members are the Chairs, Presidents and Chief Executives of the world's leading private sector Travel & Tourism businesses. For more information, visit: WTTC.org

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PHOTOS

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APPENDIX A:
METHODOLOGICAL OUTLINE

OXFORD ECONOMICS

TRAVEL & TOURISM'S ENVIRONMENTAL IMPACT: WATER USE

METHODOLOGICAL OUTLINE
JULY 2023

INTRODUCTION

This note describes the methodology for Oxford Economics' research into the environmental impact and resource footprint of Travel & Tourism (T&T). Specifically, it details how the water use (direct and indirect) is measured and apportioned to economic sectors.

For further details about Oxford Economics research into the wider environmental impact and resource footprint of Travel & Tourism,
see the Travel & Tourism Environmental & Social Impact Methodology.

WATER USE DEFINITION AND COVERAGE

The water use definition in this analysis refers to fresh water. It is based on water withdrawals statistics from the UN Food and Agriculture Organisation's statistics (UN FAO AQUASTAT). This concept describes the water drawn from renewable freshwater resources (e.g., rivers, lakes, and groundwater) by human infrastructure. Our calculations also include the direct use of non-conventional sources (e.g., treated wastewater, desalination).

These national water use data are split into three broad categories:

- **Agriculture**: fresh water used for irrigation, livestock and aquaculture purposes. Principally self-supplied (rather than drawn from public mains water networks).
- **Industry**: water used by mining, manufacturing, power supply and construction industries. Principally self-supplied.
- **Municipal**: primarily the fresh water that is supplied via public networks, to commercial and domestic users. This subcategory is interpreted to represent water consumption by service sectors[1] and households. However, it does also include some water that is used by agriculture or industrial firms (for example, those in urban centres and/or small-scale activities that use mains water rather than a dedicated self-supply).

Given that this water use measure pertains to fresh water, it is broadly comparable with the 'blue' water footprint, as defined by the Water Footprint Network. It does not include the other elements of the WFN framework, such as green water or grey water.

[1] Service sectors here refer to ISIC Rev.4 divisions 45-98.

We note throughout our reporting, the terms water 'use', water 'withdrawals' and water 'consumption' may be used interchangeably and are not intended to refer to different concepts. Where the term 'water footprint' is used, it is intended to mean direct and indirect water use (i.e., inclusive of the 'embodied' water in products purchased by Travel & Tourism from its value chain), it is not intended to refer to the Water Footprint Network concept.

DERIVATION OF WATER USE INTENSITIES

The Travel & Tourism analysis disaggregates these three AQUASTAT sectors further, into the 34-industry scheme employed by the Global Sustainability Model (GSM). This industry scheme uses ISIC Rev. 4 based sector definitions.

To achieve this breakdown, the input-output (I-O) accounts of each country are used. These economic accounts measure each sector's transactions of various products including water.[2] The relationships described in them can be used to estimate how much of each AQUASTAT water demand category is contributed by each of the 34 detailed sub-sectors.

This disaggregation allows for national water use (in m^3 terms) to be allocated to the appropriate sub-sectors. Following this, each industry's demand for water was expressed as a proportion of their gross output (in dollar terms). This is the water use intensity, measured in m^3 per dollar of output or GDP.

TRAVEL & TOURISM WATER USE

Our modelling allocates tourist-related expenditures, sourced from OE/WTTC's EIR research, among the industries that accrue this spending.[3] The scale of production that this spending stimulates, and the water use associated with it, is termed the **direct** water consumption of Travel & Tourism.

The GSM also permits the measurement of the supply chain activity that supports this production, both in the domestic economy and in other nations. The sum total of all supply chain activity linked to Travel & Tourism, and the water demands of this activity, are presented as indirect or **value chain water use.**

[2] The product flows described in I-O accounts are measured in monetary values. These monetary sums also include imputed values for commodities that are used by an industry but not purchased from an external party, i.e., those which are produced and consumed by the same entity (e.g., self-supplied water). As such, the monetary values can be considered broadly representative of total water use, including self-supply.

[3] The expenditures used to define the Travel & Tourism sector includes all spending by inbound tourists and domestic tourists, plus Travel & Tourism-linked capital expenditures by businesses and governments.

Fig. 1: ISIC categories contained in simplified OE/WTTC results sectors

Simplified category	ISIC Rev. 4 Code	Sector Detail
Agriculture & Food	01-03	Agriculture, forestry and fishing
	10-12	Food products, beverages and tobacco
Manufacturing	13-15	Textiles, clothing and accessories
	16	Wood products and parts
	17-18	Paper products and printing
	19	Petroleum refining
	20-21	Chemicals and pharmaceuticals
	22	Rubber and plastic products
	23	Other (non-metallic) mineral products
	24	Basic metals
	25	Fabricated metal products
	26	Computers, electronics and optical products
	27	Electrical equipment
	28	Other machinery and equipment
	29	Motor vehicles and parts
	30	Other transport equipment
	31-33	Other manufacturing; R&M
Utilities	35-39	Electricity, gas, water and waste services
Retail and Wholesale	45-47	Wholesale and retail trade
Transportation	49-53	Transportation and storage
Hospitality	55-56	Accommodation and food services
Other	05-06	Mining and extraction (energy products)
	07-08	Mining and extraction (non-energy products)
	09	Mining support services
	41-43	Construction
	58-60	Publishing and broadcasting activities
	61	Telecommunications
	62-63	IT and other information services
	64-66	Finance and insurance
	68	Real estate activities
	69-82	Other business sector services
	84	Public administration
	85	Education
	86-88	Human health and social work
	90-96	Arts, entertainment, recreation and other services
	97-98	Private households as employers

Fig. 2: Income category and regional classifications used in the study

ISO Code	Country	Region (WTTC)	Income Category (World Bank 2022-23)
REU	Reunion	Africa	High income
SYC	Seychelles	Africa	High income
ANG	Anguilla	Americas	High income
ATG	Antigua And Barbuda	Americas	High income
ABW	Aruba	Americas	High income
BRB	Barbados	Americas	High income
BMU	Bermuda	Americas	High income
VUK	British Virgin Islands	Americas	High income
CAN	Canada	Americas	High income
CYM	Cayman Islands	Americas	High income
CHL	Chile	Americas	High income
CUW	Curacao	Americas	High income
GLP	Guadeloupe	Americas	High income
MTQ	Martinique	Americas	High income
PAN	Panama	Americas	High income
PRI	Puerto Rico	Americas	High income
KNA	St. Kitts and Nevis	Americas	High income
BHS	The Bahamas	Americas	High income
TTO	Trinidad And Tobago	Americas	High income
USA	United States	Americas	High income
URY	Uruguay	Americas	High income
VIR	US Virgin Islands	Americas	High income
AUS	Australia	Asia-Pacific	High income
BRN	Brunei	Asia-Pacific	High income
HKG	Hong Kong	Asia-Pacific	High income
JPN	Japan	Asia-Pacific	High income
MAC	Macao	Asia-Pacific	High income
NZL	New Zealand	Asia-Pacific	High income
SGP	Singapore	Asia-Pacific	High income
KOR	South Korea	Asia-Pacific	High income
TWN	Taiwan	Asia-Pacific	High income
AUT	Austria	Europe	High income
BEL	Belgium	Europe	High income
HRV	Croatia	Europe	High income
CYP	Cyprus	Europe	High income
CZE	Czechia	Europe	High income
DNK	Denmark	Europe	High income
EST	Estonia	Europe	High income
FIN	Finland	Europe	High income
FRA	France	Europe	High income
DEU	Germany	Europe	High income
GRC	Greece	Europe	High income
HUN	Hungary	Europe	High income
ISL	Iceland	Europe	High income
IRL	Ireland	Europe	High income
ITA	Italy	Europe	High income

ISO Code	Country	Region (WTTC)	Income Category (World Bank 2022-23)
LVA	Latvia	Europe	High income
LTU	Lithuania	Europe	High income
LUX	Luxembourg	Europe	High income
MLT	Malta	Europe	High income
NLD	Netherlands	Europe	High income
NOR	Norway	Europe	High income
POL	Poland	Europe	High income
PRT	Portugal	Europe	High income
ROU	Romania	Europe	High income
SVK	Slovak Republic	Europe	High income
SVN	Slovenia	Europe	High income
ESP	Spain	Europe	High income
SWE	Sweden	Europe	High income
CHE	Switzerland	Europe	High income
GBR	United Kingdom	Europe	High income
BHR	Bahrain	Middle East	High income
ISR	Israel	Middle East	High income
KWT	Kuwait	Middle East	High income
OMN	Oman	Middle East	High income
QAT	Qatar	Middle East	High income
SAU	Saudi Arabia	Middle East	High income
ARE	United Arab Emirates	Middle East	High income
BWA	Botswana	Africa	Upper middle income
GAB	Gabon	Africa	Upper middle income
LBY	Libya	Africa	Upper middle income
MUS	Mauritius	Africa	Upper middle income
NAM	Namibia	Africa	Upper middle income
ZAF	South Africa	Africa	Upper middle income
ARG	Argentina	Americas	Upper middle income
BLZ	Belize	Americas	Upper middle income
BRA	Brazil	Americas	Upper middle income
COL	Colombia	Americas	Upper middle income
CRI	Costa Rica	Americas	Upper middle income
CUB	Cuba	Americas	Upper middle income
DMA	Dominica	Americas	Upper middle income
DOM	Dominican Republic	Americas	Upper middle income
ECU	Ecuador	Americas	Upper middle income
GRD	Grenada	Americas	Upper middle income
GTM	Guatemala	Americas	Upper middle income
GUY	Guyana	Americas	Upper middle income
JAM	Jamaica	Americas	Upper middle income
MEX	Mexico	Americas	Upper middle income
PRY	Paraguay	Americas	Upper middle income
PER	Peru	Americas	Upper middle income
LCA	St. Lucia	Americas	Upper middle income
VCT	St. Vincent and the Grenadines	Americas	Upper middle income
SUR	Suriname	Americas	Upper middle income
VEN	Venezuela	Americas	Upper middle income

ISO Code	Country	Region (WTTC)	Income Category (World Bank 2022-23)
CHN	China	Asia-Pacific	Upper middle income
FJI	Fiji	Asia-Pacific	Upper middle income
KAZ	Kazakhstan	Asia-Pacific	Upper middle income
MYS	Malaysia	Asia-Pacific	Upper middle income
MDV	Maldives	Asia-Pacific	Upper middle income
n/a	Other Oceanic States	Asia-Pacific	Upper middle income
THA	Thailand	Asia-Pacific	Upper middle income
TON	Tonga	Asia-Pacific	Upper middle income
ALB	Albania	Europe	Upper middle income
ARM	Armenia	Europe	Upper middle income
AZE	Azerbaijan	Europe	Upper middle income
BLR	Belarus	Europe	Upper middle income
BIH	Bosnia and Herzegovina	Europe	Upper middle income
BGR	Bulgaria	Europe	Upper middle income
GEO	Georgia	Europe	Upper middle income
MDA	Moldova	Europe	Upper middle income
MNE	Montenegro	Europe	Upper middle income
MKD	North Macedonia	Europe	Upper middle income
RUS	Russia	Europe	Upper middle income
SRB	Serbia	Europe	Upper middle income
TUR	Türkiye	Europe	Upper middle income
IRQ	Iraq	Middle East	Upper middle income
JOR	Jordan	Middle East	Upper middle income
DZA	Algeria	Africa	Lower middle income
AGO	Angola	Africa	Lower middle income
BEN	Benin	Africa	Lower middle income
CMR	Cameroon	Africa	Lower middle income
CPV	Cape Verde	Africa	Lower middle income
COM	Comoros	Africa	Lower middle income
CIV	Cote d'Ivoire	Africa	Lower middle income
EGY	Egypt	Africa	Lower middle income
SWZ	eSwatini	Africa	Lower middle income
GHA	Ghana	Africa	Lower middle income
KEN	Kenya	Africa	Lower middle income
LSO	Lesotho	Africa	Lower middle income
MAR	Morocco	Africa	Lower middle income
NGA	Nigeria	Africa	Lower middle income
COG	Republic of Congo	Africa	Lower middle income
STP	Sao Tome and Principe	Africa	Lower middle income
SEN	Senegal	Africa	Lower middle income
TZA	Tanzania	Africa	Lower middle income
TUN	Tunisia	Africa	Lower middle income
ZWE	Zimbabwe	Africa	Lower middle income
BOL	Bolivia	Americas	Lower middle income
SLV	El Salvador	Americas	Lower middle income
HTI	Haiti	Americas	Lower middle income
HND	Honduras	Americas	Lower middle income
NIC	Nicaragua	Americas	Lower middle income

ISO Code	Country	Region (WTTC)	Income Category (World Bank 2022-23)
BGD	Bangladesh	Asia-Pacific	Lower middle income
KHM	Cambodia	Asia-Pacific	Lower middle income
IND	India	Asia-Pacific	Lower middle income
IDN	Indonesia	Asia-Pacific	Lower middle income
KIR	Kiribati	Asia-Pacific	Lower middle income
KGZ	Kyrgyzstan	Asia-Pacific	Lower middle income
LAO	Laos	Asia-Pacific	Lower middle income
MNG	Mongolia	Asia-Pacific	Lower middle income
MMR	Myanmar	Asia-Pacific	Lower middle income
NPL	Nepal	Asia-Pacific	Lower middle income
PAK	Pakistan	Asia-Pacific	Lower middle income
PNG	Papua New Guinea	Asia-Pacific	Lower middle income
PHL	Philippines	Asia-Pacific	Lower middle income
SLB	Solomon Islands	Asia-Pacific	Lower middle income
LKA	Sri Lanka	Asia-Pacific	Lower middle income
TJK	Tajikistan	Asia-Pacific	Lower middle income
UZB	Uzbekistan	Asia-Pacific	Lower middle income
VUT	Vanuatu	Asia-Pacific	Lower middle income
VNM	Vietnam	Asia-Pacific	Lower middle income
UKR	Ukraine	Europe	Lower middle income
LBN	Lebanon	Lebanon	Lower middle income
IRN	Iran	Middle East	Lower middle income
BFA	Burkina Faso	Africa	Low income
BDI	Burundi	Africa	Low income
CAF	Central African Republic	Africa	Low income
TCD	Chad	Africa	Low income
COD	DR Congo	Africa	Low income
ETH	Ethiopia	Africa	Low income
GIN	Guinea	Africa	Low income
MDG	Madagascar	Africa	Low income
MWI	Malawi	Africa	Low income
MLI	Mali	Africa	Low income
MOZ	Mozambique	Africa	Low income
NER	Niger	Africa	Low income
RWA	Rwanda	Africa	Low income
SLE	Sierra Leone	Africa	Low income
SDN	Sudan	Africa	Low income
GMB	The Gambia	Africa	Low income
TGO	Togo	Africa	Low income
UGA	Uganda	Africa	Low income
ZMB	Zambia	Africa	Low income
SYR	Syria	Middle East	Low income
YEM	Yemen	Middle East	Low income

July 2023

The modelling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

APPENDIX B:

ADDITIONAL RESOURCES

The examples of water-related tools, including models, frameworks, and standards that can offer further support to T&T Businesses.

Step 1 ASSESS & DEFINE

Ceres	Ceres Aqua Gauge	Link
WORLD RESOURCES INSTITUTE	WRI Aqueduct Data tools	Link
FRESHWATER HEALTH INDEX	Freshwater Health Index	Link
Sustainable Hospitality Alliance	SHA – Destination Water Stress Index (DWRI)	Link
CAPITALS COALITION	Natural Capital Protocol	Link
WWF	WWF Water Risk Filter	Link
ECOLAB	Ecolab Water Risk Monetizer	Link
ISO	ISO 14046:2014 Water Footprint	Link
water footprint network	Water Footprint Assessment Manual	Link
U.S. GREEN BUILDING COUNCIL MEMBER	LEED Indoor Water Use Reduction Calculator	Link
LIVING BUILDING CHALLENGE	Living Building Challenge (Water Petal)	Link
Sustainable Hospitality Alliance	SHA – Hotel Water Measurement Initiative (HWMI)	Link
UN GLOBAL COMPACT	UN Global Compact CEO Water Mandate guides on setting water targets	Link Link
	Science Based Targets for Nature - Freshwater	Link
Sustainable Hospitality Alliance	SHA – Business Case for Sustainable Hotels	Link
ALLIANCE FOR WATER STEWARDSHIP	Alliance for Water Stewardship Sandard (AWS Standard)	Link

Step 3 EXECUTE & COLLABORATE

GSTC Global Sustainable Tourism Council	Global Sustainable Tourism Council Certification	Link
ALLIANCE FOR WATER STEWARDSHIP	Alliance for Water Stewardship Standard (AWS Standard)	Link
WaterSense Meets EPA Criteria	The EPA WaterSense Label	Link
WaterAid	Water Aid WASH Supply Chain Tools (2021)	Link
WORLD BANK	World Bank Water & Sanitation PPP Toolkits	Link
UN GLOBAL COMPACT	UN Water Action Hub	Link

Step 4 MONITOR & REPORT

wbcsd	WBCSD Circular Transition Indicators (CTI) Tool	Link
Sustainable Hospitality Alliance	SHA – Hotel Water Measurement Initiative (HWMI)	Link
CDP	CDP Water Security Questionnaire and Water Impact Index	Link Link
TNFD	Taskforce on Nature-related Financial Disclosures (TFND)	Link
IFRS	IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information	Link
GRI	Global Reporting Initiative	Link
	UN Sustainable Development Goals	Link
EFRAG	European Sustainability Reporting Standards	Link

APPENDIX C:
GLOSSARY

Term	Definition	Source
Ballast water	Ballast water is pumped in to maintain safe operating conditions throughout a voyage. While essential for safe and efficient modern shipping operations, it may pose serious ecological, economic and health problems due to the multitude of marine species carried in ships' ballast water.	IMO
Baseline	Value of impacts (on nature) or state (of nature) against which an actor's targets are assessed in a particular previous year or particular previous years.	SBTN
Baseline water stress	Baseline water stress refers to the ratio of water withdrawals compared to available renewable water supplies. Its unit of measurement is as a percentage and the ratios are categorised in five water stress levels, according to the Aqueduct World Resources Institute (WRI) guidelines: • Extremely High (>80%) • High (40-80%) • Medium-High (20-40%)	Adapted from WRI
Corporate water footprint	The corporate water footprint is defined as the total volume of freshwater that is used directly (in the company's operations) and indirectly to run and support a business throughout its entire value chain (including production of raw materials, components, and intermediate goods, transportation, packaging, and distribution). It is divided into three components: • Blue Water – the volume of consumptive water use taken from surface waters and aquifers, • Green Water – the volume of evaporative flows (found in soils rather than major bodies of water) used, • Grey water – the theoretical volume of water needed to dilute pollutants discharged to water bodies to the extent that they do not exceed minimum regulatory standards.	Adapted from Water Footprint Network & UN CEO Water Mandate
Dependencies	Aspects of nature's contributions to people that a person or organisation relies on to function, including water flow and quality regulation; regulation of hazards like fires and floods; pollination; carbon sequestration.	SBTN
Double materiality	Double materiality is the union (in mathematical terms, i.e. union of two sets, not intersection) of impact materiality and financial materiality. A sustainability topic or information meets the criteria of double materiality if it is material from the impact perspective or from the financial perspective or from both of these two perspectives.	EFRAG
Early warning system	An integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events.	UNDRR
Ecosystem	A dynamic complex of plant, animal, and microorganism communities and the non-living environment interacting as a functional unit. Within this definition, the term "unit" relies on the identification of a distinct function as well as a "dynamic" grouping of biotic and abiotic factors.	SBTN
Freshwater	Naturally occurring water on the Earth's surface with a low concentration of dissolved solids, including salt, e.g. in ice sheets, ice caps, glaciers, icebergs, bogs, ponds, lakes, rivers and streams. This surface water source includes water of a quality generally acceptable for, or requiring minimal treatment to be acceptable for, domestic, municipal or agricultural uses.	Adapted from ESRS E3
Groundwater (renewable and non-renewable)	Water, which is being held in, and can be recovered from, an underground formation. Renewable groundwater sources can be replenished within 50 years and are usually located at shallow depths. Non-renewable groundwater has a negligible rate of natural recharge on the human timescale (more than 50 years) and is generally located at deeper depths than renewable groundwater; this is sometimes referred to as 'fossil' water.	ESRS E3
Impacts	Can be positive or negative contributions of a company or other actor toward the state of nature, including pollution of air, water, or soil; fragmentation or disruption of ecosystems and habitats for nonhuman species; and alteration of ecosystem processes.	SBTN
Integrated Water Resources Management (IWRM)	A process that promotes the coordinated development and management of water, land, and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment.	Global Water Partnership 2000
Materiality	A way of distinguishing importance or significance.	SBTN
Nature based solutions (NbS)	NbS include actions to protect, conserve, restore, sustainably use, and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic, and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience, and biodiversity benefits.	UNEP

Nature related risks	Potential threats posed to an organisation linked to their and wider society's dependencies on nature and nature impacts. These can derive from physical, transition and systemic risks.	TNFD
Net Positive Water Impact (NPWI)	NPWI is an enterprise ambition that manifests in water-stressed basins to create impact where it matters most. Delivering NPWI contributes toward reducing water stress in its three dimensions: availability (quantity), quality, and access. NPWI is quantifiable against the three dimensions of water stress, aligns with established methodologies (e.g. context and science-based water targets), and can be measured via both short-term outputs and long-term outcomes.	Adapted from Water Resilience Coalition
(Nature related) Physical risks	Nature related physical risks are a direct result of an organisation's dependence on natural resources and ecosystems. Physical risks are usually location-specific and can be categorised as either acute (short-term, event-based risks), chronic (risks from long-term changes in environmental conditions), or both.	Adapted from TFND
Recycled/reused water	Water and wastewater (treated or untreated) that has been used more than once before being discharged from the undertaking's boundary, so that water demand is reduced. This may be in the same process (recycled) or used in a different process within the same facility or another of the undertaking's facilities (reused).	ESRS E3
Sanitation	Access to, and use of, excreta and wastewater facilities and services that ensure privacy and dignity, ensuring a clean and healthy living environment for all.	UNW-DPAC
Science based targets	Measurable, actionable, and time-bound objectives, based on the best available science, that allow actors to align with Earth's limits and societal sustainability goals.	SBTN
Stakeholder	Entity or individual that can reasonably be expected to be significantly affected by the reporting organisation's activities, products and services, or whose actions can reasonably be expected to affect the ability of the organisation to successfully implement its strategies and achieve its objectives.	GRI
Supply chain	The full range of activities or processes carried out by entities upstream from the undertaking, which provide products or services that are used in the development of the undertaking's own products or services. This includes upstream entities with which the undertaking has a direct relationship (often referred to as a first-tier supplier) or an indirect business relationship.	ESRS 1
Supply chain water footprint of a business	The supply chain (or indirect) water footprint of a business is the volume of freshwater consumed or polluted to produce all the goods and services that form the input of production of a business.	Water Footprint Network
(Nature-related) Transition risks	Nature-related transition risks are risks that result from a misalignment between an organisation's strategy and management and the changing regulatory, policy or societal landscape in which it operates.	Adapted from TFND
Wastewater	Water which is of no further immediate value to the purpose for which it was used or in the pursuit of which it was produced because of its quality, quantity, or time of occurrence. Wastewater from one user can be a potential supply to a user elsewhere. Cooling water is not considered to be wastewater.	ESRS E3
Water basin	The area of land that provides all surface runoff and subsurface waters to a given waterbody. Also referred to as a 'watershed' or 'catchment'.	SBTN
Water challenge	Water-related issues including physical water scarcity, insufficient freshwater quality, and/or regulatory restrictions on water use.	SBTN
Water consumption	The amount of water drawn into the boundaries of the undertaking (or facility) and not discharged back to the water environment or a third party over the course of the reporting period.	ESRS E3
Water discharge	The sum of effluents and other water leaving the boundaries of the organisation and released to surface water, groundwater, or third parties over the course of the reporting period.	ESRS E3
Water-Energy-Food (WEF) Nexus	The 'nexus' term in the context of water, food and energy refers to these sectors being inextricably linked so that actions in one policy area commonly have impacts on the others, as well as on the ecosystems that natural resources and human activities ultimately depend upon.	UNECE
Water footprint of a consumer	The total volume of freshwater consumed and polluted for the production of the goods and services consumed by the consumer. It is calculated by adding the direct water use by people and their indirect water use. The latter can be found by multiplying all goods and services consumed by their respective water footprint.	Water Footprint Network
Water footprint of a product	The water footprint of a product (a commodity, good or service) is the total volume of freshwater used to produce the product, summed over the various steps of the production chain. The water footprint of a product refers not only to the total volume of water used; it also refers to where and when the water is used.	Water Footprint Network
Water footprint offsetting	Offsetting the negative impacts of a water footprint is part of water neutrality. Offsetting is the last step, after a prior effort of reducing a water footprint insofar reasonably possible. Compensation can be made by contributing to (for example, by investing in) a more sustainable and equitable use of water in the hydrological units in which the impacts of the remaining water footprint are located.	Water Footprint Network
Water intensity	Water intensity refers to the water used per unit of value added per economic activity. Its unit of measurement is usually in m3 per US dollars.	UN

Water related risk	The possibility of a company experiencing a water-related challenge (e.g. water scarcity, water stress, flooding, infrastructure decay, drought, weak water governance). The extent of risk is a function of the likelihood of a specific challenge occurring and the severity of the challenge's impact. The severity of impact itself depends on the intensity of the challenge, as well as the vulnerability of the company.	CEO Water Mandate
Water resilience	While there are numerous definitions of water resilience, in this report we use the term to emphasise business capacity to successfully respond and adapt to external shocks and crises related to water challenges and learn from disruptions. Building resilience enables businesses to continue or quickly resume operations to sustain and increase competitiveness.	Adapted from World Bank
Water stewardship	The use of water that is socially and culturally equitable, environmentally sustainable, and economically beneficial, achieved through a stakeholder inclusive process that involves site- and catchment-based actions.	Alliance for Water Stewardship
Water stress	The ability, or lack thereof, to meet human and ecological demand for fresh water. Compared to scarcity, water stress is more inclusive, considering physical scarcity, water quality, and the accessibility of water.	CDP, adapted from CEO Water Mandate
Water use	The water drawn from renewable freshwater resources (e.g. rivers, lakes, and groundwater) by human infrastructure. It also includes the direct use of non-conventional sources (e.g. treated wastewater, desalination), although this is relatively minor in most regions. It encompasses water delivered through public networks, as well as self-supplied (e.g. by agriculture, for irrigation and livestock). UN FAO data is split into three main categories of water use: agriculture, industry, and municipal (i.e. domestic & service-sector industries). These broad water categories are split into more detailed ISIC (International Standard Industrial Classification) industries for the purpose of this report.	Adapted from UN FAO AQUASTAT
Water withdrawal	The sum of all water drawn into the boundaries of the undertaking from all sources for any use over the course of the reporting period.	ESRS E3

WTTC STRATEGIC PARTNERS