

The background features a complex pattern of overlapping, concentric circles in a light teal color, creating a ripple effect. Overlaid on this is a dense, intricate network of darker teal lines that resemble a tangled web or a complex circuit board. The overall aesthetic is modern and technical.

## 1. Introduction

Water and climate change are inextricably linked. As rising temperatures spur the hydrological cycle, climate change will affect water availability and quality, as well as hydrological variability and extremes, such as floods and droughts.

Actions in the water sector, including water resources management, as well as water supply and sanitation services<sup>1</sup>, will substantially shape the resilience of communities and ecosystems. Not surprisingly, the water sector has received the largest sectoral share of international public climate adaptation finance in the last years (CPI, 2019).

This report aims at improving the understanding of complex interrelations between climate change and water, and, based on this understanding, at identifying the most adequate water actions for mitigating greenhouse gas (GHG) emissions and improving climate resilience. It does so by synthesising state-of-the-art knowledge and research from a physical as well as from a political perspective, and, on that basis, by recommending appropriate action, while referring to good practices and methodologies.

The report primarily targets water practitioners, and decision-makers in the water sector, and the water expert community, aiming to help them better understand how the water sector and water-related activities can specifically contribute to climate mitigation and adaptation goals through meaningful action. However, serving as a comprehensive knowledge base, the report does not solely provide evidence-based information for water actors, but also for members of the climate change community.

Financial and political support also increase the water sector's responsibility to "do the right thing". It is wrong to assume that water action automatically improves climate resilience. For instance, the mere extension of conventional supply from non-renewable water sources might even be counter-productive and increase long-term vulnerability, in particular if climate change causes increasingly severe water stress in a region. Governments and international development partners have been aware that knowledge on the current and future climate conditions and their impacts on water resources in a specific area are indispensable for successful adaptation to climate change. Therefore, *Chapters 2 to 5* of this report provide an overview on climate and water interactions, climate change and impact modelling, including its potential uncertainties, as well as climate change trends at the global level and in selected river basins. The latter were selected in a way that illustrates the wide range of regionally different climate change impacts on river basins, mostly focusing on regions with emerging and developing economies.

With these elements in mind, water management approaches can provide the right answers for addressing climate risks. It is not just about adding climate readiness to "business as usual" solutions. *Chapter 6* shows how water has the potential to proactively advance climate action through emphasising the impacts of its own established and innovative concepts, always in the context of reducing climate vulnerability and GHG emissions, and complying with the criteria for adaptation and mitigation activities and finance.

While water is key to climate resilience, the water sector also contributes to the emission of GHG, with considerable mitigation potential.

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<sup>1</sup> As defined by the OECD Development Assistance Committee (DAC) Creditor Reporting System (CRS): water supply and sanitation (DAC 5 code 140), excluding waste management/disposal (OECD, 2019).

Not only does the water sector use a large amount of energy through water treatment and supply processes that might cause CO<sub>2</sub> emissions; wastewater management also contributes to emissions of other highly potent GHG, such as methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). Technologies and tools to mitigate emissions are already available, including for utilities in emerging and developing countries.

The sustainable management of water-related ecosystems bears additional opportunities. Surface waters exposed to a high influx of untreated domestic, agricultural, or industrial wastewater are substantial sources of CH<sub>4</sub> and N<sub>2</sub>O. Moreover, water-related freshwater ecosystems, such as wetlands – particularly peatlands – function as carbon pools and sinks of global relevance. Wetland protection and management activities can significantly reduce GHG emissions, and, at the same time, improve climate resilience and advance sustainable development. Water sector and water-related sources of GHG emissions, and their respective mitigation potential, are described in *Chapter 7*.

Climate change mitigation and adaptation, including cross-cutting activities, are subject to a complex governance regime at the international, regional, national, and sub-national

levels. Due to the increasing focus on these overarching policy processes, the implementation of climate action through water also depends on its being considered a crucial step in reaching the respective goals. Therefore, participation in relevant policy processes and coordination with key actors, also on sustainable development and disaster risk management, provides another success factor for low-carbon, resilient societies through water action.

*Chapter 8* helps to understand the main policy processes and underpinning institutional frameworks, enabling water actors to precisely address and combine relevant policy processes, adaptation and mitigation opportunities, and co-benefits.

It is time for the water sector to confidently rely on and promote its own strengths, while taking even more responsibility in shaping the future of climate action. For this reason, the present study encourages water stakeholders to further account for the given realities of international and national climate frameworks and structures, while actively developing pivotal water solutions for their successful implementation.

In other words – **Stop floating, start swimming!**

## References



### 1.1 References

CPI (Climate Policy Initiative) (2019): **Global Landscape of Climate Finance 2019**.

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