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Corporate Engagement in Water Policy and Governance: A Literature Review on Water Stewardship and Water Security

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ABSTRACT: Water is a central ingredient of all economic activities. Even so, water-using corporations were long absent from the theoretical and practical developments of water management, governance and policy. The past 15 years, however, have seen the emergence, proliferation and gradual maturation of global initiatives, guidelines and tools that focus on the role of business and their value chains under the banners of corporate water stewardship and water security. This article takes stock of the available literature and reviews the development to date. It traces the origins of key concepts and initiatives that are part of this new corporate engagement in water policy and governance, and looks at the landscape and corporate-level drivers of the phenomena. The paper reviews the evolution of the associated theory and practice; it also examines the impact of corporate engagement in water on business strategies and actions, and observes the influence it has had on stakeholders and settings from the national to the global level. While the available evidence base is still fragmented, the review findings confirm the previously documented controversies of operating at the public–private interface of water. Among water-using companies, the water stewardship approach is increasingly positioned as a means of achieving collective water security, merging these two fields; in practice, however, the results indicate still-narrow gains. The article concludes with a call for a comprehensive evaluation of corporate water initiatives and for a transdisciplinary research agenda that steers the engagement towards more equitable and sustainable outcomes.

KEYWORDS: Water stewardship, water security, water governance, water policy, business, value chains

INTRODUCTION

When looking for the key actors and structures at the heart of the pressing water crises of today and tomorrow, a powerful group hides behind the sector-based global water use and consumption data (FAO, 2024), that is, water-using corporations and their international value chains and networks. Water is a central ingredient in all economic activities including agriculture, energy production, extraction and process industries, technology and retail. Collectively, the companies behind these economic activities are, "the single largest user and influencer of freshwater resources globally" (Ceres, 2022). Even so, corporations in these sectors were long absent from the theoretical and practical developments of water policy and governance. In the 1990s, at the time of the early academic debates on private sector agency in water (see Buller, 1996; Grusky, 2001; Bakker, 2005; Goldman, 2007), the focus was mainly on the privatisation of water utilities and water services. This reflected the donor engagement with – and the civil society scrutiny of and opposition to – the neoliberal policies in the Global North and the structural adjustment programmes of the World Bank in the Global South. From the late 1970s onwards, Integrated Water Resources Management (IWRM) frameworks and associated analyses have emphasised the importance of including water-using sectors among other stakeholders in water resources management (Rahaman and Varis, 2005). Implementation, however, has faced various challenges including lack of

incentives for businesses to engage (Hepworth, 2009). Except for a few notable examples such as the Mersey Basin Campaign in the UK, which was initiated in 1985 (Hepworth, 2012), it took until the late 2000s for the focus – in practice and literature – to begin shifting to water-using businesses and their capacities, influence and perspectives. This shift was visible in the water initiatives that were being spearheaded by the World Economic Forum (WEF), International Finance Corporation (IFC), UN Global Compact, World Wide Fund for Nature (WWF) International, and donors such as the then UK Department for International Development (DFID) and the German Ministry for Economic Cooperation and Development (BMZ). Corporations, in parallel, began to actively engage in global water discourses and spaces.

Corporate engagement in water has been described as constituting a 'progression ladder' or 'journey'. It starts from internal 'own house in order' improvements, that is, water *management*; it then moves on to collective action in the catchment, or value chain *governance*; eventually, it extends to influencing water *policy* (Hepworth, 2012; WWF, 2013; Morgan, 2018; CEO Water Mandate, 2024a). Conceptually, corporate engagement in water management and governance has been placed under the banner of corporate *water stewardship* where governance engagement is seen as leading to new management measures; corporate *policy* engagement, on the other hand, has been associated with *water security*. In practice, however, corporate engagement in water management, governance or policy does not always take place in the linear order that the ladder approach suggests. Concerns around water security also drive stewardship action. For analytical purposes however, separating out the three spheres of engagement and their conceptual framings provides a useful distinction.

Taking a narrative review approach, this article covers the academic and selected grey literature on 'corporate water stewardship' and 'corporations and water security' that has been published during the last 15 years. During this time, the field has proliferated and matured and evidence of the first outcomes and impacts regarding the associated initiatives has emerged.

In this review, we have made two notable exclusions. First, while water management related aspects are linked to water stewardship practice as noted above, we have left out the vast and diverse literature on the technical water management solutions that have been adopted by various industries. This review concentrates on taking stock of the governance and policy considerations of corporate engagement in water, an exercise that is in need of an update (for the earlier takes, see notably Hepworth, 2012; Newborne and Dalton, 2016). Second, while water infrastructure is a field with major corporate consolidation and power and is closely linked to discourses on water security, we have excluded water utilities and hydropower generation. This is because the bodies of work and the conceptual framing of analyses focusing on them are largely separate from those of the water-using sectors, which are the focus of this review.

We aim specifically to address the following questions: What are the prevailing definitions for corporate water stewardship and framings around corporations and water security? What is the background of the associated global initiatives and what does their current landscape look like? What is our understanding of the drivers of corporate engagement in water? How have the theory and practice of corporate engagement in water policy and governance evolved? What evidence do we have of the impacts of the engagement? And, finally, what recommendations for the practice of water management, governance and policy can be drawn and what research gaps exist?

In response to these questions, the following section unpacks corporations as actors in water management, policy and governance; it does so by, first, tracing the origins of the key concepts and associated initiatives and, second, exploring the drivers of corporate engagement. We then focus on the evolution of corporate water stewardship and water security engagement and review the evidence for the diversification of the engagement across sectors, actors and regions. We then move to taking stock of the impact of the engagement to date and the resulting governance and policy considerations, before

concluding with an assessment of the key research gaps and a summary of the central priorities for the way forward.

CORPORATIONS AS ACTORS IN WATER MANAGEMENT, POLICY AND GOVERNANCE

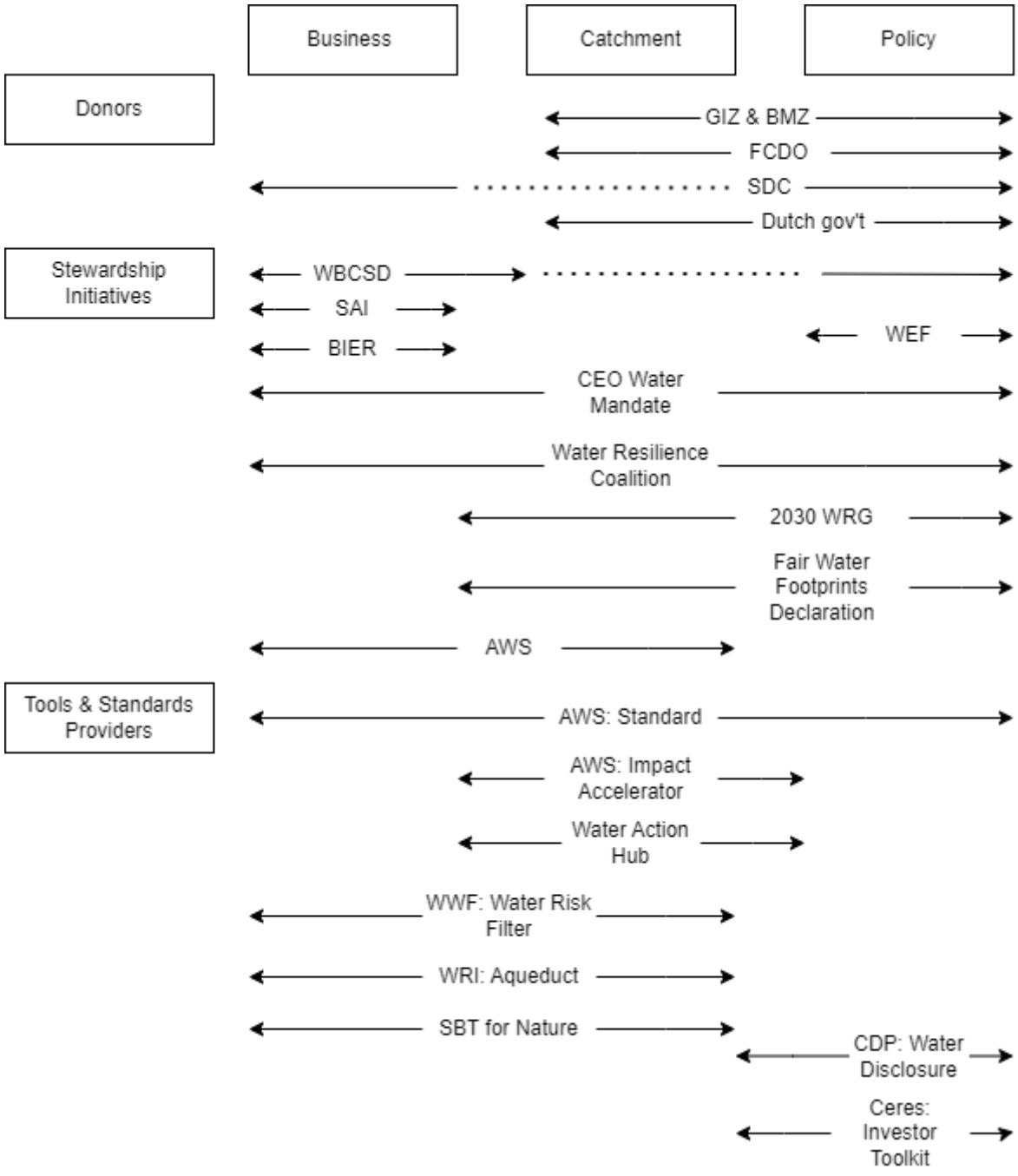
Chronology of key concepts and corporate water initiatives

Around the late 2000s, the role of water-using corporations in water management, policy and governance began to gain space and attention in international water and economic fora. The current corporate water initiative landscape came about through the intermixing of conceptual and methodological developments with the agendas of the public and private sectors and that of NGOs. Figure 1 illustrates the main public donors, the broader stewardship initiatives, and the providers of tools and standards that currently shape this space. Each listed entity is placed on a spectrum that ranges from those operating in the business space to those who are engaged at the catchment or policy levels. The arrows stretching from each entity denote what spaces the actor/initiative occupies. This demonstrates the variation in scope even among the same type of actors or within the same types of initiatives. Some stewardship initiatives, for example, consist solely of corporate actors and aim mainly to further guidelines for their members; such actors include World Business Council for Sustainable Development (WBCSD), the Sustainable Agriculture Initiative Platform (SAI Platform), and the Beverage Industry Environmental Roundtable (BIER). Others, such as the 2030 Water Resources Group (2030 WRG), are made up of a mix of private and public actors; these, with a broader scope, strive to influence catchment- and national-level water governance and policy. It should be noted that the list of actors and initiatives presented here is not exhaustive, but simply gives illustrative examples that provide a general overview and demonstrate the range of players involved. The following subsections detail the main actors and milestones of the evolution of corporate water stewardship and water security engagement.

Water stewardship: The emergence of a concept and a practice

The emergence of the concept and practice of water stewardship is the cumulative result of a diverse range of developments. Conceptually, the idea of 'water footprints' was among the crucial stepping stones in what later evolved into corporate water stewardship (Hepworth and Orr, 2013; Rudebeck, 2019). The water footprint concept has its roots in Tony Allan's seminal work on virtual water (see Allan, 1998, 2011; Allan et al., 2003). 'Virtual water' is a term that was initially used to illustrate the amount of water used in the production of internationally traded agricultural goods. Simply put, the water footprint of a particular good can be defined as its cumulative virtual-water content throughout its life cycle and value chain (Hoekstra, 2003). Around 2005, the concept was picked up by the WWF with the intention of, "prompt[ing] a new kind of discussion with companies and governments – one that raised essential questions about vulnerability to water risk" (WWF, 2014: 62). 'Risks', in this case, represented terminology that was familiar to both the private sector and governments (Orr et al., 2009). The water footprint concept was put into action in a report on the UK's water footprint (Chapagain and Orr, 2008). This report generated headlines stating that over half of the UK's water consumption – and its impacts – was being outsourced abroad. In 2009, the water footprint concept was highlighted in a collaborative study between WWF and SABMiller (a South African multinational brewing and beverage company that in 2016 became part of the Belgium-based AB InBev). The study aimed to calculate the total water consumption of SABMiller's beer value chain in South Africa and the Czech Republic (WWF and SABMiller, 2009). The key message of these first landmark analyses was that companies should start to look beyond the fence lines of their operations and value chains into the surrounding catchments. The total water consumption volumes were striking. However, it became evident that the context of their consumption mattered more than the numbers themselves (Chapagain and Tickner, 2012).

Figure 1. Global corporate initiative landscape with examples of key initiatives and organisations.



Note: GIZ = Deutsche Gesellschaft für Internationale Zusammenarbeit; BMZ = Federal Ministry of Economic Cooperation and Development (Germany); FCDO = Foreign, Commonwealth and Development Office; SDC = Swiss Agency for Development and Cooperation; WBCSD = World Business Council for Sustainable Development; SAI = Sustainable Agriculture Initiative; BIER = Beverage Industry Environmental Roundtable; WEF = World Economic Forum; 2030 WRG = 2030 Water Resources Group; AWS = Alliance for Water Stewardship; WWF = World Wide Fund for Nature; WRI = World Resources Institute; SBT = Science Based Target. The CDP was established as the *Carbon Disclosure Project* in 2000, but it has since broadened the scope of environmental disclosure to incorporate deforestation and water security, while also supporting cities, states and regions; in 2013, the name was shortened to 'CDP'.

In 2006, Australia's Millennium Drought gave a parallel push to explorations of developing a national water stewardship standard. Inspired by the Forest Stewardship Council's standard and certification scheme, the aim was to develop a standard to support sustainable and socially acceptable water use by businesses. Around this time, many similar ideas and initiatives had begun to drive stewardship theory and practice in various parts of the world. The CEO Water Mandate under the UN Global Compact, for example, was formed in 2007 at the initiative of the UN Secretary-General Ban Ki-moon. WWF International and the Water Footprint Network focused their efforts on engaging companies, and the CDP developed corporate disclosure frameworks for collecting companies' water-related data for investors. More geographically focused, The Nature Conservancy was active in driving corporate engagement in North and Latin America, Water Witness International did the same in Eastern Africa, and the European Water Partnership was similarly active in Europe. In 2008, the contribution of the Australian initiative together with that of all these other initiatives and actors culminated in the formation of the global Alliance for Water Stewardship (AWS). The AWS International Water Stewardship Standard was launched in 2014 after pilot projects in Australia, at Lake Naivasha in Kenya, and in South Africa's Western Cape (Forbes, 2018).

In addition to the organisations involved with water footprinting and the development of the AWS stewardship standard, a plethora of other service providers and initiatives began offering tools and frameworks ranging from water risk analysis to disclosure and reporting (see Figure 1). On the donor side, the International Water Stewardship Programme (IWaSP) was a flagship stewardship initiative that was active between 2013 and 2019. It was run by the German GIZ and was co-funded by the German BMZ and the UK's DFID (now the Foreign, Commonwealth and Development Office, or FCDO), and had country-level programmes in Ethiopia, Grenada, Kenya, Pakistan, Saint Lucia, South Africa, Tanzania, Uganda and Zambia. Around the same time, the 2030 Water Resources Group (2030 WRG) was established. Between 2012 and 2017 it was hosted by the International Finance Corporation (IFC), and since 2018 it has been a part of the World Bank Global Water Practice (2030 WRG, 2024). By the spring of 2024, it was actively engaged in country-level water stewardship platforms and projects in Bangladesh, Ethiopia, India, Kazakhstan, Kenya and South Africa (see Figure 1 above and Section 2.1.2 below).

As corporate water stewardship emerged as a concept and practice, it consolidated the key role of corporate water users as actors in water management and governance. Critically, corporate water stewardship rested on the notion of the necessity of managing 'shared water risks' for business and society via 'collective action' (Orr et al., 2009; CEO Water Mandate, 2010). Internal water management measures by corporations were seen as insufficient to tackle the broader problems that were posing a risk to business such as water scarcity, ecosystem degradation, and deteriorating infrastructure. In the logic of stewardship initiatives, those broader problems were perceived to be a result of public governance failure, especially in the developing economies of the Global South (Hepworth, 2012). The underlying 'common pool resource' thinking originated by Elinor Ostrom (Ostrom, 2008) emphasised that water users are the best water managers; this continues to inspire current water stewardship initiatives (WWF et al., 2023). The role of corporations in contributing to water problems in the first place, and thus having a fundamental responsibility to address them, has also been acknowledged in the stewardship discourse, albeit to a lesser extent (Hepworth and Orr, 2013; Sojamo, 2016; Newborne and Dalton, 2016). Nevertheless, rather than being framed as an inherent responsibility, externally induced 'water risk' and, lately, 'business opportunity' have been positioned as the dominant drivers of corporate action, both for stewardship and for water security engagement (as further detailed in the sections below).

Positioning water stewardship as a complementary, bottom-up approach to IWRM, the Alliance for Water Stewardship (AWS) currently defines it as, "the use of water that is socially and culturally equitable, environmentally sustainable and economically beneficial, achieved through a stakeholder-inclusive process that includes both site- and catchment-based actions" (AWS, 2019).

AWS further recognises five areas of stewardship performance and related action: 1) good water governance, both internally and within the catchment and national policy context; 2) sustainable water

balance, including water efficiency measures; 3) good water quality, including pollution-curbing measures; 4) healthy status of important water-related areas, including ecosystem protection and restoration measures; and 5) access to water, sanitation and hygiene (WASH) for all, at least for on-site employees but, ideally, extending to associated local communities.

According to the corporate water engagement ladder logic (see the Introduction and, among others, WWF, 2013; Morgan, 2018), the higher up a company climbs (that is, progressing from engaging in water management, to participating in governance, to being involved in formulating policy), the more critical it becomes for it to collaborate with stakeholders. For this reason, collective action continues to be closely linked to water stewardship; it frames not only corporate engagement in water governance and policy, but also the role of the NGOs and intermediaries that are facilitating it. The leading stewardship organisations have in the past years worked towards better aligning their own efforts in order to increase their joint impact. At the time of writing this article, collective action was being defined as, "a coordinated set of engagements among interested parties playing complementary roles, which pools together knowledge, resources and/or expertise to jointly identify and implement solutions at various geographic scales, with the aim to address shared freshwater challenges" (WWF et al., 2023).

Major national and transnational corporations played a key role in the conception of the early water security initiatives, especially those involved in 2030 WRG (see below). In contrast, the corporate water stewardship approach was to a large extent driven by actors who were external to the business community. In the literature, justifications and arguments for corporate involvement included their increasingly recognised major water use and its impacts (see, for example, Sojamo and Larson, 2012; Pahl-Wostl et al., 2013; Hoekstra, 2014; Orr and Pegram, 2014; Taherzadeh and Caro, 2019). Another rationale that was identified in the literature was the public sector's insufficient financial resources. The 2008 financial crash had left much public funding in ruins, requiring both governments and civil society to look for new sources of funding (Rudebeck, 2019). Corporate water stewardship thus stemmed to some extent from the desire of international NGOs to accelerate action on conservation and sustainable water resources management; it also emerged from their need to secure new funding streams (Daniel and Sojamo, 2012; Newborne and Mason, 2012; Rudebeck, 2019).

The emergence of corporate water stewardship was also a result of wider public and international agendas. Critically, the decades-long UN-led attempts to improve stakeholder engagement in water resources management within the frameworks of IWRM had already paved the way to include companies in water management and governance (Hepworth, 2012). In the global development agenda, as well, a broader paradigm shift occurred which emphasised private sector participation. This shift was motivated by the failure of states to tackle governance challenges and was of central importance to the legitimisation of corporations as development actors. This was accompanied by efforts to bring in private sector resources to meet global development goals (see, for example, Dunning and Fortanier, 2007; United Nations, 2015; Falkner and Buzan, 2019). The majority of the literature and debates around how to bring the private sector into water financing, and into development goals more broadly, has been around the financing of physical infrastructure. Increasingly, however, the private sector is being brought into discussions around the financing of broader water security projects such as nature-based solutions, which are aimed at safeguarding both human and environmental needs (see Leflaive et al., 2022). These developments are further concretised in the evolution of corporate engagement in water security and associated policy, as detailed below.

Water security: Integrating the private sector into the public policy agenda

A conceptual development that is connected to corporate water stewardship, and runs parallel with it, is that of corporate engagement in water policy via the framing of water security. Water security has no single globally accepted definition; during the past two decades, however, it has risen to become a key aim (GWP, 2000; UN Water, 2013) and a central paradigm of water resources management and

governance (Cook and Bakker, 2012; Zeitoun et al., 2016; Sadoff et al., 2020; Ahopelto et al., 2023). More recently water security has been seen to entail two related objectives. The first is to enable the sustainable use and management of water for human and ecosystem's well-being, livelihoods and economic development, and second, protecting societies, economies, and ecosystems from water-related hazards, at all levels and scales (Sadoff et al., 2020).

Drawing on a diverse range of sources, Schmidt (2021) traces the rise of water security on the global policy agenda and reflects on the role of international organisations and initiatives in involving corporations in that water security agenda. In the early 2000s, the IWRM approach faced increasing criticism for its technical rationale and water-sector centricity; it was felt to be neglecting social and institutional contexts and failing to address the mounting social equity and development challenges. Water security emerged as a concept that bridged, "existing IWRM programs [and] structural governance changes" (Schmidt, 2021: 286, citing Cook and Bakker, 2012). According to Schmidt (2021), the World Economic Forum (WEF), in close collaboration with the UN Secretary-General Ban Ki-moon, played a key role in shaping global water policy in this regard. In 2004, the WEF started to assess progress towards the Millennium Development Goals and to publish "global risk" reports; in 2007, the UN Global Compact CEO Water Mandate, the special initiative by the Secretary-General, was launched at the Davos WEF meeting; and in 2009, prompted by global food and energy price shocks and again on the request of the Secretary-General, the Davos meeting focused on water security. In 2011, the WEF began framing water security in its Global Water Initiative via the water-food-energy-climate nexus (Waughray, 2011). The nexus approach created a new normative basis from which international organisations could highlight that, contrary to IWRM thinking, water was already integrated across sectors; this led, in turn, to policy being tasked with addressing the, "structural undervaluation of water in the global economy" (Waughray, 2011, cited in Schmidt, 2021: 287). What followed was an interpretation adopted by several international organisations and initiatives that market mechanisms and financing schemes involving the private sector were the solution to guarantee the human right to water and sanitation as presented by the 2010 UN General Assembly Resolution; that they would enable the achievement of the 2015-launched UN Sustainable Development Goals; and that they would allow for management of water risks to business and society, that is, that they would ensure water security (Schmidt, 2021). In the section Impact of corporate engagement and action, we will revisit what has been the experience to date in this regard.

Corporations were directly positioned as water security and policy actors with the launch of the 2030 WRG and its *Charting our Water Future* report, both closely linked to the WEF Water Initiative (2030 WRG, 2009). The 2030 WRG was initiated by Nestlé S.A.'s former CEO Peter Brabeck-Letmathe and the World Bank's IFC. They were joined by several transnational corporations and were initially supported by entities such as the global management consulting firm McKinsey & Company, WWF International, the UN Food and Agriculture Organisation (FAO), and the Stockholm International Water Institute (SIWI) (Waughray, 2011). The group's initial report featured provocative headlines stating that by 2030 global demand for water would outstrip supply by 40% (2030 WRG, 2009). This indicated social and environmental crises as well as a substantial economic risk to businesses that relied on a stable supply of freshwater.[1] Drastic efficiency improvements across all sectors were thus called for and, more controversially, so was the prioritisation of 'higher value uses' (Karunananthan, 2019; also see below for more detail). Proactive business engagement was therefore presented as justified (2030 WRG, 2009; Larson et al., 2012). The 2030 WRG has evolved into, "a public, private, civil society multi-donor trust fund" hosted by the World Bank Group; it aims to, "[help] countries achieve water security by 2030 (SDG 6) by facilitating collective action on water issues between government, the private sector, and civil society (SDG 17)". It is currently active in six countries of the Global South and exiting from a further five (2030 WRG, 2024).

[1] More recently, despite being heavily contested in international debates, this figure has been reiterated by the Global Commission on the Economics of Water (Mazzucato et al., 2023).

Convergence of water stewardship and water security

Water stewardship and water security are conceptually distinct concepts; in the context of water-using corporate engagement, however, the separation is not always clear cut. Different actors apply different framings and a number of actors are involved in discourses and developments in both; however, there is also evidence that the fields are converging, with stewardship being increasingly positioned to provide the means to achieve both water security and water resilience (Sojamo, 2016; Julio et al., 2021; Lucas et al., 2024). The convergence of the concepts can also be seen in the ladder and journey approaches presented in the Introduction. In those approaches, companies' management and governance activities are aimed at influencing policy; however, in their practical implementation, water security is stated as a goal to be achieved through water stewardship actions at the country level.[2] Water security is also framed as the ultimate objective in discussions around increasing corporate water disclosure (see, for example, CDP, 2024a).

Corporations have also taken their place in the global water policy space; they have made public claims to take action to help achieve water security, including with water stewardship action. Garrick and Hall (2014), in their review of corporate water initiative publications, note that beyond the WEF processes building the international water security agenda as described above, the failure of the 2012 Rio+20 meeting to properly address water security threats was among the key factors resulting in spikes in corporate interest in water security. At the UN 2023 Water Conference in New York, dozens of side events related to corporate action were hosted (UN Water Conference, 2023); there was also an unprecedented presence of water- (UN Water, 2023) and business-related (Fortune, 2023) entities at the 2023 UN Climate Change Conference (COP28) in Dubai.

Already a decade ago, corporate water stewardship and corporate engagement in water security policy were being called a "new paradigm" (Hepworth and Orr, 2013) and an "emerging transnational water governance regime" (Daniel and Sojamo, 2012). In the following sections, we will further unpack the underlying drivers of corporate water policy and governance engagement; we will then evaluate their extent and influence, revisiting these early claims.

Changing drivers

The previous section reviewed the macro perspective on the rising corporate engagement in water, that is, the international landscape and the actors there that facilitated this development. Turning to the micro level, this section reviews the literature that examines the incentives for companies to respond to these calls. Unpacking these incentives at a corporate level has gained plenty of attention both in practice and in the theory of water stewardship. The analysis focuses both on the business case for companies to engage in water and on understanding the corporate strategies for engagement.

In line with business management literature, corporate drivers of changes in management practices to address sustainability and social responsibility have typically been classified into two main categories: internal and external (Delmas and Toffel, 2008; Walker et al., 2008; Kranz, 2011; Methner, 2013; Sojamo, 2016). The former encompasses *organisational* drivers that relate to a corporation's organisational values, culture and human and material resources, that is, its internal governance; the latter, in comparison, looks at *institutional*-level drivers, which comprise the influencing factors arising from the corporation's operating environment. Using a similar categorisation when analysing corporate water behaviours, Newborne and Dalton (2019a) group drivers as actors with their associated instruments. They find five groups: 1) companies, including their internal drivers; and external actors, including 2)

[2] See, for example, 2030 WRG (2024), and the Natural Resources Stewardship Programme, or NatuReS; the latter is the 2018-to-2023 continuation of the International Water Stewardship Programme, or IWaSP, which was active from 2013 to 2019 (GIZ, 2023).

regulators/governments; 3) consumers/customers; 4) investors; and 5) brokers such as stewardship initiatives and NGOs.

There has as yet been relatively little empirical scrutiny of the internal drivers that push businesses to engage specifically in water-related matters. This is probably because gaining insights into the internal modus operandi of a company demands special resources and access by researchers. Studies that do explore this realm, however, highlight that important prerequisites for holistic, context- and knowledge-based water strategy and action include a robust commitment at the top levels, enthusiastic organisational champions, comprehensive data, high levels of knowledge and expertise, and good communication between headquarters and operation locations (Kranz, 2011; Daniel and Sojamo, 2012; Methner, 2013; Sojamo, 2016; Fraser et al., 2021). Martinez (2015), citing the broader literature on business ethics, adds another dimension to internal drivers, highlighting the differences and a common tension between the ethical and instrumental, – typically economic – motives behind corporate water behaviour.

Studies on the external drivers are, in comparison, plentiful (see, for example, Kranz, 2011; Daniel and Sojamo, 2012; Hepworth, 2012; Larson et al., 2012; Sojamo and Larson, 2012; Methner, 2013; Signori and Bodino, 2013; Jones et al., 2015; Aivazidou et al., 2016; Jia et al., 2019; Taherzadeh and Caro, 2019; Innis and Kunz, 2020; Yu et al., 2020; Lanari et al., 2021; Zhang et al., 2021). This literature, in its examination of the external factors, suggests that proactive corporate engagement in water tends to stem from a need to mitigate external water-related hazards. These observations are in line with the typology of physical/operational, reputational/stakeholder, political/regulatory, and litigation water risks that is proposed in the practical literature on corporate water stewardship (Morikawa et al., 2009; Barton, 2010; WWF, 2013).

A concept meriting specific attention with water risks as external drivers is that of 'shared water risks', also referred to above (Orr et al., 2009; Pegram et al., 2009; CEO Water Mandate, 2010). While shared water risk shaped the early water stewardship discourse, many theorists and practitioners soon began to highlight the fact that stakeholders experience water risks in different ways (Vos and Boelens, 2014; Sojamo, 2015; Baleta, 2015; Baleta and Winter, 2017); this is a notion that was also reflected in parallel water security discussions (Zeitoun et al., 2016). The focus has since shifted to 'shared water challenges' and 'water as an opportunity' (see, for example, Sarni, 2011; Sarni and Grant, 2018). Depending on the context and on the organisational capacities of corporations, this body of grey literature suggests that corporate engagement in water should be taken beyond risk management measures and should tap into new business opportunities; in this context, innovative problem-solving should address collective water security challenges via new practices and policies (Sarni, 2011; Orr and Pegram, 2014; Schulte et al., 2014; Morgan, 2018; Sarni and Grant, 2018), constituting a positive 'water handprint' (Guillaume et al., 2020).

More recently, the body of literature looking at external factors has started to also focus on the role of investors, as companies are experiencing increased external pressure from investors to take action and address water risks (see, for example, Innis and Kunz, 2020; Yu et al., 2020; Afrin et al., 2022; Rudebeck, 2022; see also earlier works, notably Money, 2014a, 2014b). There is growing evidence that water does not just pose an economic risk to companies, that it also presents a financial risk to investors that, if materialised, can jeopardise return on investment (ROI); this is demonstrated by the analyses of the CDP (see, for example, CDP, 2024a) and Ceres (Ceres, 2023). In the last decade, investors have started to urge companies to improve their reporting on water-related risks in order to better understand the issue and mitigate negative effects on long-term returns. Norges Bank Investment Management (NBIM), for example, is the world's largest sovereign wealth fund which, at the time of writing, was valued at US$1.7 trillion; it urges companies to, "integrate water management into their corporate strategy, risk management and reporting" (NBIM, 2022). The CDP water programme began collecting water security data from companies in 2009; since then it has grown into the world's most comprehensive corporate water disclosure framework and dataset on corporate water risks. It has thus contributed substantially to building the evidence base for how water poses material risks to companies and the corporate actions

taken to alleviate those risks. Ceres is a think tank based in North America that seeks to advance sustainability leadership among investors, companies and capital market influencers; together with the CDP, Ceres has continuously been raising the profile of water not just as an economic issue but also as a financial one (Rudebeck, 2022).

The key, and eventually ultimate, external drivers of change in business practices are policy, regulation and litigation. Weak policy and regulation can result in a risk to business due to the uncertainty they pose, thus driving unilateral or collective action on water, which has been described to have been the case with the donor-led stewardship initiatives in the Global South. Tightening regulation has a stronger effect though, setting the rules of the game for all (Hepworth, 2012; Sojamo, 2015; Jia et al., 2019).

Recent developments in the Sustainable Finance Package[3] accompanying the European Green Deal, for example, impose a major regulatory framework for companies to step up their game on water, particularly in Europe (CDP, 2022). This has been driven primarily by the embedding of the concept of double materiality in the Corporate Sustainability Reporting Directive (CSRD) (Chiu, 2022). Previously, companies had only to disclose issues that were material to their business (financial materiality); with the new legislation, they will also be required to report on the actual or potential short-, medium- and long-term impacts on people or the environment that are directly linked to a company's operations and its value chain (impact materiality). The union of two distinct sets of considerations – financial materiality and impact materiality – requires companies to undertake a 'double materiality assessment'; this broadens the concept of materiality from a sole focus on financial materiality to one that includes a view of the impact on stakeholders and society. To comply with regulations, companies now must undertake the double materiality assessment and consider a range of topics, including water. The extent to which the other instruments associated with the Sustainable Finance Package address water issues varies however; for example, the criteria for the Taxonomy Regulation Delegated Act regarding the sustainable use and protection of water and marine resources (Document C(2023)3851, Annex 1) is largely based on already-existing – and demonstrably insufficient – EU legislation. The Taxonomy has been generally criticised for its unscientific criteria and for leaving out key sectors and activities that have major environmental impacts (EEB, 2023). In late 2023, representing a more progressive development, the Council of the European Union and the European Parliament reached a provisional agreement on the content of the Corporate Sustainability Due Diligence Directive (CSDDD). It covered both human rights and environmental aspects related to water (Council of the EU,2023). In the European Council, however, its requirements were substantially diluted, including removal of all references to sustainable water use, though the human rights considerations remained. In April 2024, it was approved by Parliament and was, as expected, endorsed by the Council; it entering into force later in 2024. The EU member states will have two years to transpose it into their national laws (European Parliament, 2024).

What is notable with all the Sustainable Finance Package instruments is their potential power to impose new sustainability standards for all the major supply and value chains connecting to Europe (see below; Vos and Boelens, 2014). This is despite their addressing only larger companies, plus the recent compromises in their content. Little attention has yet been paid, however, to their repercussions on low-income countries, where the associated human rights violations and environmental problems are likely most prominent (Ngangjoh-Hodu et al., 2023).

The following section provides an overview of the literature on the theory and practice of corporate water stewardship and water security. Then in the subsequent section, we further review the effectiveness and implications of the aforementioned corporate water engagement drivers against the evidence on the results and impacts of water stewardship and security initiatives to date.

[3] These include: the EU Taxonomy Regulation; the Corporate Sustainability Reporting Directive (CSRD) which addresses corporate sustainability reporting and constitutes an amendment to the already-existing reporting requirements of the Non-Financial Reporting Directive (NFRD); and the Corporate Sustainability Due Diligence Directive (CSDDD) (European Commission, 2024).

CORPORATE ENGAGEMENT IN WATER POLICY AND GOVERNANCE: EVOLVING THEORY AND PRACTICE

In this section, we trace the evolution of the theory and practice of corporate water stewardship and water security policy engagement from four distinct perspectives: 1) the range of academic disciplines tackling corporate engagement in water policy and governance, their associated framings, and their linkage to practice; 2) the coverage across sectors; 3) the coverage of value chain and network actors and structures involved; and 4) the geographical scope of both practical action and its analysis.

Evolution of the disciplines and dominant framings in literature

The contributions, relationship and responses of academic analyses to the evolution of corporate water stewardship and corporate engagement on water security policy has been dynamic, though somewhat fragmented from the start. Around 2010, corporate engagement that was linked to the aforementioned initiatives and developments began to get covered in academic publications at varying depths; however, well below 100 relevant academic peer-reviewed articles come up when search terms are used such as water stewardship/water security, private sector/corporate/company/business, and water governance/water policy. The CEO Water Mandate, on the other hand, lists 577 works in its library, mainly grey literature publications. While still relatively narrow, the academic literature covering the topics can be classified into four different groups: 1) water resources management; 2) business management; 3) corporate water use in the political economy context; and 4) interdisciplinary water governance.

The first group of literature that started covering water-using corporate involvement was water resources management literature; it focused largely on water footprinting and Life Cycle Analysis (LCA) methodologies (see, for example, Hoekstra et al., 2011; Rozza et al., 2013; for more recent publications, see, for example, Vlachos and Aivazidou, 2018; Corredor et al., 2021). This group was the first to bring to the fore crucial technical aspects and quantitative evidence; this has been central in raising awareness of the critical linkages between businesses and their value chains and water security. While central at the time of the first studies, discussion around the practice of corporate water stewardship has to a large extent moved beyond water footprints. It is now recognised that stewardship and water security contributions must be assessed in a broader manner than looking only at water volumes (see, for example, Chapagain and Tickner, 2012). There is nevertheless a recognition that companies need quantifiable data to build a business case for engagement.

The need for quantitative data has been met with the development of corporate water accounting frameworks (Signori and Bodino, 2013; Burritt and Christ, 2017; Christ and Burrit, 2017), water footprint sustainability assessments of companies and their value chains (Hoekstra, 2017) and of investors (Hogeboom et al., 2018), water risk assessments (for example, Larson et al., 2012; Schaefer et al., 2019), and frameworks for water neutrality, water-offsetting and water replenishment (for example, Hoekstra, 2008; Nel et al., 2008; Franssen, 2023). The grey literature further presents methodologies for volumetric water benefit accounting (Reig et al., 2019) and so-called Net Positive Water Impact (CEO Water Mandate, 2024b), as well as science-based targets for nature including targets for water quantity and quality (Science Based Targets Network, 2023). None of these, however, have been without their controversies or limitations. Mirroring the language of the carbon community, the debate has recently begun to centre around 'net positive water', evoking terminology such as 'net', 'neutral', 'compensation', and 'offsetting'. While gaining a lot of traction, methodologies such as these have so far not been able to capture the full social and environmental impacts of economic activities on water resources; nor have they been able to incentivise the needed actions by companies in complex hydrological, ecological and sociopolitical settings (see, for example, Sojamo, 2015; Newborne and Dalton, 2016; Morgan and Dobson, 2022). The methodological development of water target setting and impact assessments (see, for example, Reig et al., 2021; Science Based Targets Network, 2023), when properly contextualised (Dobson and Morgan, 2021), may prove to be most transformative. While target setting has not been without its

controversies (see, for example, the debate on science-based targets for carbon emissions in Andersen et al., 2021; see also Bendig et al., 2022; Bjørn et al., 2022), it ultimately raises questions on the justification of corporate water use and allocation in the first place, which has long been the elephant in the room for the initiatives (Sojamo, 2015; Newborne and Dalton, 2016).

The second and surprisingly narrow group consists of water-focused business management literature and corporate sustainability and responsibility studies. The paper by Martinez (2015) is one of the few comprehensive works in the field that develops a framework for corporate water responsibility and managerial response patterns; published nearly a decade ago, this paper noted the scarcity of literature on the topic. Its author observed that the few earlier works focused mainly on internal technical aspects (for example, Kurland and Zell, 2010) or dealt with water only in the broader sustainability context without addressing its specificities (for example, Kang, 2013; Peloza, 2009; Whiteman et al., 2013). The latter trend has continued, with no mention of even the word 'water' in major systematic reviews on corporate sustainability research (see, for example, Burbano et al., 2022). There have, however, been a few exceptions offering a limited number of descriptive analyses of corporate water strategy developments (see, for example, Fogel and Palmer, 2014; Jones et al., 2015; Weber and Saunders-Hogberg, 2020; Morris et al., 2023) and a few analyses of corporate water disclosure, its drivers and content (for example, Yu et al., 2020; Wicaksono and Setiawan, 2022; Morris and Guenther, 2023). Mundle et al. (2017) present a case study of the benefits of the private meta-governance of the International Social and Environmental Accreditation and Labelling Alliance (ISEAL) behind the Alliance for Water Stewardship; Bunclark and Scott (2022) – adding broader governance context considerations to the picture – develop a framework for corporate water reporting in emerging economies, presenting a case study in Peru. Apart from these notable exceptions, this body of literature has still largely failed to link corporate engagement in sustainability issues with broader issues of water use, management and governance.

The third group of literature does exactly that, looking at corporate water use in the broader political economy context. This literature derives from global environmental justice considerations, focusing on a general critique of market environmentalism and privatisation in the water sector (see, for example, Conca, 2005; Bakker, 2014). Several papers explore justice concerns related to private and foreign land and water resources grabbing; they refer to experience with similar developments in other forms of private engagement, especially in the Global South (Borras et al., 2010; Allan et al., 2012; Mehta et al., 2012; Franco et al., 2013; Vos and Boelens, 2014). More recently, financialisation of water, and its repercussions, have gained increasing research attention (Loftus et al., 2019; Leflaive et al., 2022; Rudebeck, 2022).

The fourth group of literature, which could be labelled 'interdisciplinary water governance literature', combines approaches from social sciences and human geography. It aims to take a holistic approach and combines elements of all the other three groups (for a still-topical overview of the central research directions, see Hepworth, 2012). This group has focused specifically on corporate water stewardship and security engagement. It unpacks corporate agency in water policy and governance in more detail, shedding light on: 1) their structural, bargaining and ideational power in global and national economies and governance fora (Sojamo et al., 2012; Sojamo and Larson, 2012; Sojamo, 2016; Karunananthan, 2019; Rudebeck, 2019; Schmidt, 2021); 2) corporate motivations to engage (Kranz, 2011; Newborne, 2011; Newborne and Mason, 2012; Daniel and Sojamo, 2012; Methner, 2013; Rudebeck, 2019); and 3) case studies examining the implementation and implications of the global initiatives and corporate engagement on the ground (for example, Vos and Boelens, 2014; Sojamo, 2015; Lanari et al., 2018; Boldbaatar et al., 2019; Karunananthan, 2019; Damonte and Boelens, 2019; Lanari et al., 2021; Saenz, 2022). In the following subsections, we will have a closer look at their sectoral, actor and geographical focus, and in the subsequent section we will present their key findings regarding governance and policy implications.

Evolution of the range of sectors involved

As agriculture (including textile fibre production), and food and beverage industries are the largest water consumers globally, businesses in those sectors were among the first ones targeted and they were also the early engagers in water stewardship and water security policies (see also above). Some of them, such as The Coca-Cola Company in India, also faced fierce civil society pressure. After the initial governance failure whereby the authorities granted them unsustainable permits, the company was eventually given regulatory orders to move their operations from the water-scarce areas. These materialisations of water risks accelerated their engagement in water, internal prioritising, and engineering of global water stewardship initiatives and standards (Daniel and Sojamo, 2012; Fogel and Palmer, 2014; Jones et al., 2015). Due to their dominant water use and their direct linkage to food security and livelihoods globally, agriculture and the food and beverage industry justifiably remain the focus of most academic analyses. Publications to see in this regard include: Sojamo and Larson (2012) on Nestlé, Bunge and Cargill as water management and governance agents; Fogel and Palmer (2014) on Coca-Cola's work on water; Jones et al. (2015) on water reputation management in the food and beverage industry; Baleta and Winter (2017) on risk understandings in the agricultural sector in South Africa; Aivazidou and Tsolakis (2020) on drivers, barriers, and practices of water stewardship in Italian wine industry; Lanari et al. (2018) on the impact of export-oriented commercial horticulture on water resources in Kenya; Jia et al. (2019) on themes of water stewardship in agricultural supply chains; Taherzadeh and Caro (2019) on drivers of water use in the international soybean trade; and Lanari et al. (2021) on the export-oriented fruit industry in South Africa's Western Cape. The major part of practical guidance development is also targeted at these sectors (see, for example, SAI, 2010; BIER, 2015; Morgan, 2017).

The green energy transition, and technology development more broadly, are generating a growing need for certain minerals. Sustainable and fair practices in extractive industries such as mining are thus receiving increasing practical attention (ICMM, 2014; EITI, 2023); they are also increasingly becoming the subject of academic scrutiny (for example, Kunz and Moran, 2014; Fraser and Kunz, 2018; Hamilton, 2019; Kunz and Moran, 2021). Both the practical guidance documents and the academic work highlight the criticality of ensuring the social licence to operate with transparent and inclusive processes, to adopt technologies that are adapted to growing water scarcity, to mitigate environmental harm, and to protect the health of both workers and the surrounding communities.

Beyond the agricultural, food and beverage, and mining sectors, the representation in the literature gets more uneven. The Water Watch analysis of the CDP's water programme has ranked sectors and supply chains by their water impact (CDP, 2021), indicating the critical sectors that should receive special attention. Financial services with its major steering capacity across all sectors (see above) is ranked at the top; it is followed by fossil fuels, cotton farming, apparel (including textiles and fabric goods), metallic mineral mining, chemicals, and farming of other crops. Based on a comprehensive scientific review of different industry impacts, Ceres and the University of Saskatchewan list food products, textiles, and high tech and electronics as the greatest threat to freshwater systems and the biggest contributors to groundwater depletion, metals contamination, plastic pollution, diversion and transfer of water, and eutrophication (Ceres, 2022). Apart from farming and mining, as described above, these other sectors have still received relatively little academic focus in terms of their water use, management, and governance practices. As described above, financial services are increasingly targeted by global stewardship actors; during the past few years, academic publications on their specific role in environmentally, socially and economically sustainable water use have become more numerous (see Money, 2014a; Zhang et al., 2021; Leflaive et al., 2022; Afrin et al., 2022; Rudebeck, 2022). When it comes to apparel and textiles – despite water risks and impacts being prominent along their value chains – narrow environmental considerations dominate the scarce literature (see Boström and Micheletti, 2016; Li and Leonas, 2022; Islam et al., 2021). Kemper and Partzsch (2019) provide an exception with their analysis of how organic and fairtrade companies position themselves as water policy entrepreneurs but, despite their stated broad sustainability aims, tend to neglect local circumstances in water governance.

Analyses focusing on broader water stewardship practices in the industry are only available from stewardship initiatives (for example, AWS, 2022; Morgan et al., 2022). At the same time, the global textile industry is under growing general criticism for its treatment of workers, its resource use, and its polluting practices (see, for example, Fashion Revolution, 2024), with more-detailed investigations promised in the coming years.

An interesting recent development, reflecting the general shift in the global political economy, has been the rising interest in water that is being demonstrated by cloud services, data search engines, and other software technology companies. Companies like Meta, Microsoft, Google and Amazon are beginning to grasp the importance of water for their operations, both for the production of hardware and for cooling of data centres. They have been announcing commitments to become "water positive" – see above for a discussion of the limitations of the term – by 2030 (Meta, 2023; Microsoft, 2023; Amazon, 2024; Google, 2024). These companies have become among the main sponsors of international flagship events such as Stockholm World Water Week, and they have started to engage in global stewardship initiatives and alliances such as the CEO Water Mandate Water Resilience Coalition (CEO Water Mandate, 2024c). There has not yet been a detailed investigation into whether these companies see water as a direct risk, as an opportunity, or as a key landscape-level issue that they should pay close attention to and attempt to influence.

From big brands to value chains

Over the years, water stewardship practice and literature has seen a shift away from focusing only on the big brands to also examining nationally operating businesses. Gradually, albeit still very slowly, there is a growing appreciation of the diversity of actors along international value chains. The early adopters and champions of water stewardship were mainly consumer-facing businesses with big global brands, including Coca-Cola, Nestlé S.A.; PepsiCo and Unilever; as a result, early company case studies also focused on them (see, for example, Daniel and Sojamo, 2012; Sojamo and Larson, 2012; Fogel and Palmer, 2014; Jones et al., 2015). Descending from the global level to national-level context and catchments, case study research now increasingly covers the water practices, governance and policy engagement of nationally operating businesses. Examples include: studies of the corporate water-reporting practices of companies in the Netherlands (Linneman et al., 2015) and in Peru (Bunclark and Scott, 2021); studies of nationally critical industries such as the fruit industry in South Africa's Western Cape (Sojamo, 2015; Baleta and Winter, 2017; Lanari et al., 2021), export-oriented agriculture in Peru (Damonte and Boelens, 2019), export-oriented commercial horticulture in Kenya (Lanari et al., 2018), and mining regions in Australia (for example, Kunz, 2020), South Africa (Kranz, 2011), Latin America (Fraser and Kunz, 2018; Campero et al., 2021 Pareja et al., 2018; Saenz, 2022) and Mongolia (Boldbaatar et al., 2019; Fraser et al., 2019); studies in Latin America of water funds as a form of payment for ecosystem services with private sector contributions (Kauffman, 2014; Bremer et al., 2016; Nelson et al., 2020); and studies of manufacturing industries in China (Spencer and Xu, 2021) and forest management in Australia (Spencer, 2021) (see the next section for their key findings regarding water governance and policy implications). Water stewardship in industrial parks has also been a focus of guideline development in China (WWF China, 2019) and South Africa (DTIC and GIZ, 2021).

Sojamo (2016) and Rudebeck (2019) highlight the importance of understanding global value chains and networks as critical water management and governance structures; they also emphasise the necessity of considering their dynamics when designing and analysing corporate water stewardship action. The extent to which companies control their value chains differs across sectors, but the level of "vertical integration" (Rudebeck, 2019, citing Gereffi and Memedovic, 2003) and "horizontal integration" (Sojamo, 2016, citing Henderson et al., 2002; Gereffi et al., 2005) point towards actors that hold major power in the chain. Vertical integration means that a company manages its supply chain and value by owning the companies that provide its inputs, distribute its products, and/or sell to retail locations. This is typical of capital-intensive sectors such as mining and other extractive industries; it is also common

among large manufacturers. Such vertical integration allows them to exercise direct control of the supply chain and thus makes them capable of, and responsible for, addressing water issues (see also Kunz and Moran, 2014; Hamilton, 2019; Kunz and Moran, 2021). In horizontally integrated systems, that is, in situations where power is held by only a few companies, the dominant companies can affect the value chain dynamics by, for example, controlling the market as main buyers. These lead firms can also exercise power in sectors where they are providers of the main production inputs, such as agribusiness (see also Sojamo et al., 2012; Sojamo and Larson, 2012; Allan et al., 2012; Garcia Ramon, 2019). They can also exert influence by introducing requirements such as sustainability standards into the chain (for examples of this in supermarket retail see Vos and Boelens, 2014; for textiles and apparel see Kemper and Partzsch, 2019). With less-consolidated and more-complex chains, lack of traceability is a challenge that is frequently cited by companies (Jia et al., 2019; Sojamo et al., 2021). There have been attempts to address this issue in the form of recently developed guidance documentation (Morgan, 2017) and through coalition-forming among buyers who are sourcing from same critical areas (as, for example, in the AWS Impact Accelerator approach; see AWS, 2024a).

Besides the large transnational and national companies, two key and (notably) more-numerous groups that are part of the value chains are small and medium-sized enterprises (SMEs) and small-scale producers. There has as yet been only a limited effort to develop water risk management and stewardship practice frameworks that are suited to the SME scale of operations and influence (see, for example, Hepworth et al., 2011; Qureshi and Sayed, 2014; Baleta, 2015; Baleta and Winter, 2017; WWF, 2017). The focus of global initiatives and academic analyses alike continues to be on larger companies due to their larger resources and their associated stronger impact, and because of better access and availability of data. Increased attention to SMEs in stewardship initiatives and standards has recently been recognised as an important potential focus in the field if greater outreach and scaled-up impact are to be achieved (Lucas et al., 2024).

Similarly little – yet critical – research attention has been given to the impact of international stewardship standardisation schemes on small-scale agro-producers and their livelihoods. Vos and Boelens (2014), applying the concept of 'governmentality' (Hughes, 2001), examine how smallholders' water rights and access are affected by sustainability standards. Deriving from a literature review and from empirical examples from Peru and Ecuador, they show: 1) how sustainability standards function as "truth production" vehicles against which the existing local knowledge and practices are judged; 2) how the standards establish power relations between companies and producers; and 3) that via "techniques of visibilisation", the standards control and discipline the producers. They also note that the standards' typical requirement for compliance with national legislation may worsen local inequalities in settings of legal pluralism where national-level schemes typically favour large water users. They also observe that the global-level roundtables that develop the standards have also been dominated by big business and NGOs to the detriment of smallholders' views. Vos and Boelens (2014) call for more proactive organisation and participation of these water user groups in the development of standards at local, regional, national and global levels in order to ensure better protection of their interests. Their research findings have been echoed by the analysis of Kemper and Praetzsch (2019); a substantially broader research effort on the topic is needed, however, especially considering the acceleration in private certification that recent legislative changes (particularly in the EU) are expected to bring (see above).

Greater spread of initiatives across geographical regions

As corporate stewardship and water security initiatives have evolved, there has been an expansion in their geographical scope and in the context-situated literature that examines them (see Section 3.2). In the past 15 years, the initiatives have spread to cover Europe, North America, selected countries in Latin America, and selected countries in sub-Saharan Africa, South Asia, Southeast Asia, East Asia and Oceania (see WWF et al., 2023). In large parts of Asia and Latin America, however, stewardship is still a relatively unknown approach and term (Lucas et al., 2024). Many of the water stewardship collective action

initiatives (WWF et al., 2023), as well as programmes to strengthen water security, have been focused in a few lower- and middle-income countries that are typically supported by donor funded programmes; examples include GIZ NatuRes (GIZ, 2023) and 2030 WRG (2024). Initiatives that address activities in industrialised countries or engage domestic businesses are more scattered and harder to trace. Water stewardship as understood via the framing applied in this review is, to the authors' knowledge, explicitly a part of national water strategies or active coalition-forming in California (CAWSI, 2024) and Wisconsin in the US (The Water Council, 2024), in Finland (Finnish Government, 2023), in Ireland (Stockil et al., 2018; Gaskin et al., 2023), and in the UK (WRAP, 2021).

Starting from the early developments of virtual water flow and water footprint analyses (Allan et al., 2003; Chapagain and Hoekstra, 2008; Hoekstra and Mekonnen, 2012), besides "producing" country case studies as presented in the sections above, there has been an aim to shed light on the "consuming", importing country external water footprint and the associated global responsibility (see, for example, Chapagain and Orr, 2008; Gnehm, 2012; Nikula, 2012; WWF, 2014). This was manifested in 2021 in the form of the multistakeholder Glasgow Declaration for Fair Water Footprints that was launched at COP26 (Fair Water Footprints Declaration, 2021). The Declaration founders include Water Witness International, the CDP water programme, and Chatham House. They intend to form a strong global coalition of signatories that represent key countries and stakeholder groups including business, civil society, and external support agencies. The activities of the Declaration and delivery guidance are built on commissioned novel research and substantiated evidence from the field (Fair Water Footprints Declaration, 2023). Arguably, out of the global water initiatives the Declaration for Fair Water Footprints has the most potential to link governments to the private sector and NGO-led water stewardship and security initiatives. By placing the spotlight on global trade networks, the Declaration sets out to connect importing countries and companies in the Global North with exporting countries in the Global South. Critically, it seeks to highlight and address how much of the water issues experienced in the Global South are a direct consequence of trade-related decisions that are driven by actors in the Global North. This is a topic that is often sidelined in water security and stewardship initiatives and debates.

IMPACT OF CORPORATE ENGAGEMENT AND ACTION

After over a decade of conceptual and institutional developments, changing drivers, evolution of theory, and expansion of practice, it is important to evaluate the impact of corporate engagement in water governance and policy under the banners of water stewardship and security. Applying the engagement ladder as an organising device, in this section we first review the evidence on corporate engagement in water management, that is, internal corporate commitment and business strategy development. We then examine the types of national- and catchment-level action taken, ranging from water management to governance engagement, and we assess their impacts on the ground. We then review the influence of the engagement on governance arrangements and water policy at the national and global levels. Finally, we revisit the earlier claims that corporate engagement in water constitutes a transnational water governance regime; then – revisiting the roles of private, public and NGO actors – we examine how corporate water engagement, as it stands, delivers at the boundary between public and private interests.

Growing commitment, dispersed strategies

Starting from the internal corporate commitment to water, it is clear from available sources that the awareness among companies of water as a material business risk has grown. As such, there is also an increasing number of commitments and public statements of engagement. The most comprehensive data to support this is provided by the CDP water programme through their annual water security disclosure. In 2023, 13,356 of the "world's most impactful companies" were requested to disclose their water data. Of these, 4815 responded, representing a 23% increase from 2022 (CDP, 2024a). The disclosing companies are primarily from Asia, North America and Europe, 103 of which made it to the 2023 CDP

Water Security A-list of the best-performing companies (CDP, 2024b). Beyond the CDP, it is also valuable to look at the number of companies that have joined the CEO Water Mandate, representing the "C-Suite-level" commitment to water stewardship. The initiative sets out six commitment areas; these include direct operations, supply chain and watershed management, collective action, public policy, community engagement, and transparency. At the time of writing, the CEO Water Mandate was endorsed by over 240 companies globally (CEO Water Mandate, 2024d). Similar to the CDP, however, the commitment itself is not yet a guarantee of sustainable and fair practices by the endorser. In this regard, the AWS International Water Stewardship Standard (AWS, 2019) is the most comprehensive framework with validation and external audits, albeit only for site-level. As of April 2024, the AWS listed 279 certified sites, 54 of which had reached the highest 'platinum' performance level (AWS, 2024b). While all three initiatives involve many of the world's largest companies by both market value and revenue, many big businesses are still not part of them and SMEs are still largely out of their scope. In spring 2024, there was an intensive debate about whether there was a need to create a new enterprise-level water stewardship standard to scale up stewardship commitment and action (see, notably, Lucas et al., 2024). It remains to be seen if this will materialise.

Turning to an examination of the evidence on how successful the corporate commitment has been in changing business strategies, the past 15 years have seen a shift from companies merely treating water as a detached philanthropic PR activity to situating water closer to the strategic core of business – at least in their public discourse. With that shift, the scope of corporate strategic engagement has also expanded to extend from internal operations to value chains, gradually encompassing a broader catchment governance and policy context (CDP, 2024a). As a more diverse set of companies has become involved, it has also become evident that the 'private sector' is not one homogeneous entity. In the early days of stewardship, the engaging corporations were classified into categories of "good, bad and ugly" (Hepworth, 2012); however, there is now a growing recognition that more-nuanced categories are needed, as there is appreciation of the diversity and complexity of actors and contexts along international value chains. Companies of different sizes, with different regional affiliations, operating in different sectors, will face different challenges; they therefore need different strategies for addressing the problem (see, for example, Rudebeck, 2019).

As noted by Newborne (2011) and Newborne and Mason (2012), while water is undoubtedly gaining ground on corporate agendas, it is nevertheless daunting to merge corporate operating models with the complex realities of addressing water challenges. As they point out, companies are still first and foremost profit-making entities that are accountable to their shareholders and governed by company law. Engaging in collective action to further both private and public interest thus requires careful reinterpretation or rewriting of company constitutions. Newborne and Dalton (2016) also show that the funding structure of companies is another key limiting factor when it comes to integrating water into strategic business plans; that is, philanthropic funding continues to be freer to invest but is miniscule compared to corporate profits in general. The authors go on to observe that the further away the needed water stewardship action is from the company's operational location, the more likely it is that funding comes from charity budgets rather than from core funding. They conclude that the driver for action is thus merely securing social licence to operate, rather than engaging in transformative action (ibid). As argued by Sarni and Grant (2018), the allocation of core funding to the initiatives would be a clear proof that companies are placing water at the centre of business; this, however, is still largely absent. In water stewardship projects, companies generally bring in their expertise, not financing; the latter is still predominantly from donor or public sources, or it is under the public guarantee (Newborne and Dalton, 2016, see also Bremer et al., 2016). As such, while the evidence shows that on paper water is increasingly integrated into business strategies, the materialisation of this commitment on the ground may look very different.

In general, involving the private sector in financing water has been challenging, as highlighted in a volume on financing investments in water security that is edited by Leflaive et al. (2022). One reason is the difficulty of placing an economic value on water (Smith, 2022), which is a requirement if the private

sector is to get involved. Another underlying factor is that the private sector will only engage when there is a developed investment opportunity with an adequate risk – return profile. Most water projects are considered too high risk, which demands some form of financial structuring or risk-sharing mechanism (Gietema, 2022). The water 'sector' is also fragmented; it comprises a range of needs and requirements that make it difficult for the private sector to know what criteria to fulfil in order to engage (Alaerts, 2022; Baker, 2022). Valuing water as a part of corporate water stewardship and water security engagement has been the focus of practical guidance development (see, for example, Morgan and Orr, 2015; Reig et al., 2019), certain mechanisms such as water funds (TNC, 2022; see also below), and some academic analyses (Rudebeck, 2019, 2022); however, with the glaring water infrastructure investment gaps and the financialisation boom (Loftus et al., 2019; Leflaive et al., 2022), substantially more research attention is required.

Fragmented evidence from the ground

In our consideration of the actions taken by companies and their impacts on the ground, we observe that the available evidence base is fragmented but that some overall conclusions can be drawn. According to data from CDP (2024a), despite their reported strategic shifts, businesses' responses to water risks continue to focus on internal technical water management measures rather than on transforming their business models and/or changing their practices at the catchment level. A review of 40 corporate reports (Newborne and Dalton, 2019a) similarly shows too much focus on improving in-house water efficiency, with too little effort spent on addressing issues such as catchment water demand exceeding available supply, water quality and curbing pollution, labour rights and biodiversity. Corporate action still focuses predominantly on water management rather than on proactive governance and policy engagement measures.

The few available studies of corporate water initiatives, as well as country-level analyses of the practices of specific industries, demonstrate similarly worrying results, especially from an equity and justice perspective. These studies point towards a neglect of water's inherently political nature. The evaluation by Newborne and Dalton (2019b) of the International Water Stewardship Programme (IWaSP) 2013-2018 funded by the UK's DFID (now FCDO) and Germany's BMZ shows that the competition- and efficiency-focused company mindset in stewardship projects easily disregards equity considerations (Newborne and Dalton, 2019b). Karunananthan (2019), studying the practices of 2030 WRG in India, presents evidence of forced consensus-building and exclusion of critical voices in collective action. They also argue that the agreements introduced between farmers and water user associations in Yemen and the quotas and fees in China and South Africa effectively strip farmers of their water rights in the name of improving water efficiency. Studies of The Nature Conservancy initiated water funds as a form of payment for ecosystem services with private sector contributions in Latin America highlight the importance of public sector lead in equitable and transparent participatory arrangements (Kauffman, 2014; Bremer et al., 2016; Nelson et al., 2020). There is still, however, a shortage of comprehensive and independent evaluations of these funds as water governance instruments and of their social and policy impacts. Lanari et al. (2021), in their study of the export-oriented fruit industry in Western Cape, show how the water risk strategy adopted by the industry continues to be problematic in its depoliticisation of water allocation in the context of post-apartheid South Africa. Damonte and Boelens (2019) describe how the Ica Valley in Peru has over the past decades been transformed into a "virtual-water extraction zone" that benefits big agribusinesses, but how it has resulted in worsening social and environmental conditions for local communities and small-scale farmers. In recent years, several companies have certified their sites in the area with the AWS International Water Stewardship Standard (AWS, 2024b). The Ica Valley will thus be a critical testing ground for the standard's success in delivering sustainable and equitable outcomes. Boldbaatar et al. (2019), in a case study of the mining sector in Mongolia, demonstrate the insufficiency of the Extractive Industries Transparency Initiative (EITI) framework in addressing community – company water use conflicts (see also Fraser and Kunz, 2018). In a case study of desalination

plants that are providing water for mining operations in water-scarce Chile, Campero et al. (2021) show how the framing of the alternative water resource as inherently sustainable has depoliticised it, resulting in hydrosocial impacts getting too little consideration in the approval process. Studying mining operations in Peru, Saenz (2022) concludes that companies applying the water stewardship approach have a higher likelihood of achieving social licence to operate if they develop the water supply to not only their own benefit but also to the benefit of local communities, and if they involve local communities in monitoring the quality and quantity of their water use and its impacts. This is still an exception, however, rather than an industry-wide practice.

Moving on in our literature review from catchment-level action to the national water governance and policy arena, we observe the latter to be the most challenging space in which to productively engage. This is borne out by the available academic analyses (Kranz, 2011; Hepworth, 2012; Sojamo, 2015; Karunananthan, 2019; Lanari et al., 2021), by evaluations of country-level stewardship programmes (notably Newborne and Dalton, 2019b), and by the reflections of stewardship initiative actors themselves (see, for example, Orr and Sarni, 2015; Morgan, 2018; WWF et al., 2023). Hepworth (2012) lists a number of controversies that remain valid today; these include: conflicting interests among corporate and other stakeholders, policy and regulatory capture, privileged perspectives and consolidated power, embedded process inequities, confused and displaced priorities, and misguided interventions. Among these concerns, the key issue has been whether the corporate engagement represents an opportunity for greater water security for all or many, or a manifestation of water securitisation for some or few (Hepworth and Orr, 2013). The same authors note that corporate engagement in water management, governance and policy poses a 'prisoner's dilemma'; that is, high water risks and low public sector capacity create a pressing need for corporate engagement, but this engagement, in turn, increases the likelihood that the aforementioned controversies will materialise (ibid). Sojamo (2015), studying water stewardship initiatives in South Africa, proposes several solutions; these include: more open acknowledgment of power asymmetries between corporations and other parties; more careful and systematic evaluation of a corporation's legitimacy and ability to engage in activities for the public good and to participate in the stewardship of common pool water resources in the first place; and channelling donor support to public institutions and civil society organisations to better govern and engage on water, instead of directing money to private sector initiatives (see also the concluding section below).

Drawing overarching conclusions on the impact of in-country and catchment-level initiatives on water security would require more comprehensive and independent evaluation efforts and research evidence, which is still missing today. What is evident, however, is that the current changes in practices are still far away from matching with the different industries' overall impact (see, for example, Ceres, 2022).

Corporations shaping global water policy and discourse

Looking at how corporate engagement affects the global policy level, this body of literature is still very limited. There are focused studies that review corporate influence on particular global policy processes such as the human right to water (Karunananthan, 2019), and the interaction between international organisations and big transnational companies in shaping the water – food – energy nexus and the SDG framings (Schmidt, 2021; see above for more detail). Rudebeck (2019) provides a comprehensive assessment of how the involvement of companies has shifted the global discourse around water. Through textual analysis of over 500 documents published by companies, NGOs and other organisations active in the stewardship space, alongside qualitative expert interviews, Rudebeck shows that as a result of corporate involvement in water issues, water is being reconceptualised from being solely an environmental and social risk to society, to being an economic risk for businesses. As a result of the resource imbalance that typically exists between companies and other involved stakeholders, companies have the capacity to influence and frame the global water agenda, not only through policy but also through discursive capture. When companies participate in water interventions, they alter governance initiatives by promoting a number of different strategies that are in line with their interests. The first such

strategy is their advocating of commercial principles and methods as a way to address water scarcity, for example the use of cost – benefit analysis. Second, companies often deploy economic valuation to address water issues. Critically, it is not the water resource itself that is valued, but the financial risk attached to water scarcity. Finally, companies often call for the broader liberalisation of water governance to enable them to take a seat at the decision-making table as legitimate stakeholders. Taken together, echoing the country-level case study findings (Section 4.2), the study demonstrates that corporate involvement in addressing water issues is not a neutral endeavour as the corporate presence changes the status quo of water governance and its associated policies.

NGOs seeking alignment for impact

Besides the corporations, the role of the leading stewardship NGOs (Figure 1) merits a focus of its own. Over the years, they have played an important part in shaping the global stewardship frameworks and tools. NGOs have also facilitated national- and catchment-level collective action and partnerships ranging from invasive-species clearing and ecosystem restoration to infrastructure and policy development. Despite their predominantly shared aims, competition between NGOs has led to fragmentation in the field since the early days of stewardship action (Daniel and Sojamo, 2012; Newborne and Dalton, 2016, 2019a).

At the global level, NGO-led corporate engagement increasingly takes place within broader coalitions and multi-stakeholder collective action projects (for an overview and diagnostic framework, see WWF et al., 2023). Competition also persists, however, leading to confusion among companies (Lucas et al., 2024) and compromises in impact (WWF et al., 2023). At the time of writing this article, topical debates were occurring around the potential need for new water stewardship standards vs. harmonisation of the standard space, and around 'net positive water' as referred to above. These debates were partly spurred by actors new to the field (see, for example, GSI, 2023; Lucas et al., 2024; SCS Standards, 2024); on the one hand they bring in fresh perspectives, on the other they resurrect some of the earlier discussions.

In terms of collective action at the national and catchment levels, both the international evaluations (notably Newborne and Dalton, 2016, 2019a, 2019b) and the stewardship NGOs themselves (WWF et al., 2023) have recognised critical pitfalls. Most notably, NGOs acting as 'honest brokers' pose a risk of resource and policy capture when their revenue models are at odds with joint missions, in certain setting this can lead, in turn, to single NGOs organising and dominating stakeholder collaboration. It is recognised that collective, public, or independent funding for the NGOs is needed to ensure their objective and coordinated – if not neutral – role.

Balancing between public and private interests

As the above sections illustrate, at the heart of the controversies surrounding corporate engagement in water governance and policy is ultimately the complex interface between public and private roles and interests. We argue that the results of this review confirm the (at the time still hypothetical) description put forth by Daniel and Sojamo (2012) of a transnational water governance regime that was forming around corporate water security and stewardship engagement. As the literature shows, the converging water stewardship and security agendas have gained increasing traction during the past decade and the initiatives have produced a plethora of frameworks, tools and procedures. Although the documentation is still fragmented, the evidence points towards corporate engagement demonstrably altering the status quo of water policy and governance from the catchment level to the national and global levels. Problematically, based on the available evidence as cited above, private gain too easily overrides public interest in the regime's current operationalisations. While the detrimental impacts are typically felt by the most vulnerable groups such as small-scale water users and local communities, the misguided interventions may eventually backfire to the detriment of all parties.

Based on a review of water governance publications published between 2000 and 2016, Pahl-Wostl (2017) concludes that corporate involvement in water can trigger innovation and mobilise action in situations where there is institutional inertia and lack of governmental capacity; they also conclude, however, that it cannot and should not replace the government in its role as provider of public goods and custodian of long-term economic, social and environmental sustainability – an observation that remains valid today. The following observation from Newborne (2011: 11), reviewing company water use policies and practices, has not gone out of date either: "The 'public governance gap' in water management will not be filled by trying to stretch companies' activities beyond their own constitutions and the business activities based on them. That would be simply to substitute the public governance gap with a corporate governance gap".

As presented in the previous section, key observations and conclusions are also emerging from case studies of in-country water initiatives. These include the criticality of a stronger leading role for the public sector in setting the rules of the game, as well as more robust overall public sector involvement; there is also an observed need to guard against the advancement of narrow interests and to ensure that water stewardship action on the ground delivers a more lasting impact that is better aligned with publicly led processes. Hepworth (2012) also lists the 1985 to 2010 Mersey Basin Campaign in the UK as a prime example of the coming together of businesses, civil society and the public sector in addressing water governance failure; this is considered to be a success story that would not have been possible without the government's contributions and involvement. Spencer (2021), examining stewardship initiatives in Australia and China, and Ahopelto et al. (2023), analysing cross-sectoral water governance for water security in Finland, emphasise that to in order to deliver broader water security outcomes water stewardship action should be seen as a form of 'collaborative governance' (see, for example, Batory and Svensson 2019); this is as opposed to (as put by Spencer, 2021: 251), "CSR activities where the company retains control". As indicated above, however, advancing this type of collaborative approach is not without its challenges. There are major strategy and operational bottlenecks to changing corporate mindsets, and the worldwide underfunding of public agencies increasingly hampers the public sector's capacity to lead collaborative processes. It is evident that neither the public nor the private sector can navigate the space alone.

This takes us back to the role of NGOs. By its governance mode, Yamada (2017) describes corporate water stewardship as "goal-based hybrid governance"; it requires a "principal" that ensures that "goal displacement" by business does not take place in the absence of public regulation and coercion. Other terms are used to describe those acting as intermediaries in the corporate water governance engagement – typically NGOs; they include "promoters/broker's" (Newborne and Dalton 2019a), "facilitators" (see, for example, Fraser and Kunz, 2018), and "third parties'' (for example, Sojamo, 2015). As indicated in above, the leading stewardship NGOs have in recent years acknowledged the challenges posed by operating at the public – private interface. The NGOs leading the effort are reported to be actively reflecting their own approach; they are working together to better match their "bottom-up" initiatives with public-sector – led "top-down" processes in order to enhance the legitimacy and sustainability of the initiatives (WWF et al., 2023). In an effort to guide the reflection, Newborne and Dalton (2016) raise questions that continue to be critical to consider in any private engagement intending to influence governance and public policy of water. Questions that are particularly relevant include: whether the delegation of roles and responsibilities is clear; whether the delegation of power to private actors has been made in accordance with the permitted powers of the relevant public authorities; and to what extent the providers of water stewardship expert services – that is, NGOs – are accountable to other water users. If the answer to any of these questions is no, or is unclear, it is in the interest of all to step back and reconsider the approach. Special caution is due when imposing initiatives in the context of fragile governance.

While companies, with the support of NGOs, are now central players in water management, governance and policy, the issues outlined above show that corporate engagement on water under the

banners of water stewardship and security is no silver bullet solution. While corporate involvement has arguably given a much-needed boost to multi-stakeholder collaboration, claims that it would have patched the public governance failure (Zhang et al., 2021) are still largely unsubstantiated. The reviewed literature shows that the position and capacity of companies alone is not enough to justify their engagement. There is a need, at the outset, for a more open acknowledgment of the power asymmetries between corporations and other actors and of the issues these asymmetries may lead to in engagement processes (Schulte et al., 2014; Sojamo, 2015, 2016). The controversies outlined above are as true today as they were when they were first noted over a decade ago (Hepworth, 2012). They reiterate the need for governments and donors to step up their game in IWRM implementation and to take the lead in better integrating stewardship work and funding in order to accelerate progress toward the achievement of SDG 6 (Newborne and Dalton, 2019a).

CONCLUSIONS

The past 15 years have seen the emergence, proliferation and gradual maturation of global initiatives, guidelines and tools that are focused on the role of business and its value chains under the banners of corporate water stewardship and water security. This article has taken stock of the available literature and reviewed the development to date.

The review has shown that among water-using companies, the water stewardship approach is increasingly positioned as a means to achieve collective water security, merging two fields conceptually as well as practically. As the reviewed literature has shown, this is predominantly a result of companies and other stakeholders together moving increasingly beyond internal water security policies that are sparked by structural water risks, to focus on broader stewardship initiatives at the catchment and value chain levels. The harmonisation of frameworks, tools and procedures, as well as growth in the number and types of companies involved has further consolidated corporate water engagement as a "transnational water regime" (Daniel and Sojamo 2012). As a result, proactive private sector involvement prevails as, if not a dominant, then at least a key "paradigm" (Hepworth and Orr, 2013) in water and environmental governance, as well as in water and development policy more broadly. As external pressures on business to address water issues are increasing due to worsening water conditions, tightening regulations, and growing investor pressure, there will be a continued increase in internal motivations for these actors to engage; this will most likely further strengthen regime formation and paradigm framing.

The review has demonstrated that water is rising on corporate agendas. The literature, however, does not yet clearly show the impact this is having on business strategies and modes of operation or, by extension, how it is materialising as an impact on the ground. Some companies make claims that water takes centre stage in 'core business decisions' due to its centrality to the overall long-term viability of the business; however, the review shows that there is as yet little evidence of broader changes in practices or contributions towards solving 'shared water challenges'. There is also little evidence of companies acknowledging their own role in furthering the water crisis or addressing the overall impact of their activities on the freshwater environment; instead, the available case studies present worrying evidence of private capture of resources, policies and discourses. Corporate water initiatives and NGOs have come together in recent years to address these controversies, but as one of the anonymous reviewers of this article put it, the engagement still lacks a robust theory of change that would comprehensively link private, public and civil society roles and actions for economically, environmentally and socially sustainable and just aims.

A number of implications emerge from the above review. First, there is a need for a more comprehensive and independent evaluation of water initiatives, including lessons learned and impacts thus far. There is a parallel, and critical, need for a considerably larger academic research effort that focuses on the phenomena across sectors, actors, regions and scales. The current evidence base is

indicative but fragmented and the findings are often anecdotal; this prevents a comprehensive understanding of the barriers, opportunities and added value.

Second, the research agenda moving forward would gain from being a truly transdisciplinary one. This is a call that is repeated within the broader corporate sustainability research field (see, for example, Burbano et al., 2022). As this review has demonstrated, corporate engagement in water management and governance is a complex and multifaceted topic. It touches on a range of issues such as business, finance, law, company law, politics, ethics and water resources and, as such, it extends beyond traditional disciplinary boundaries. Venturing forward, we call on researchers to do continuous sense-checking to avoid falling into the polarised worldview that is raising its head both in the more business-focused and the more critical works; we further call on researchers to continue to bring together bodies of literature and debates that traditionally do not meet.

Third, independent and tailored funding is needed to enable this type of research. Public and private funding bodies need to come together to bridge the gaps in their current schemes. The majority of research, development and innovation funding concerning business practices focuses on enhancing market potential and leaves little, if any, room for system-level sustainability or equity considerations.

The fourth implication is that, in addition to funding, improved access to data is a fundamental prerequisite for accurate assessments. Companies need to increase their transparency and become more willing to gather and share data, including on their value chains. Corporate disclosure such as the CDP water programme and recent target-setting initiatives that put corporate water use into a broader context are promising in terms of providing comparable and verifiable data points. However, unpacking the chain of events from external drivers to internal corporate decisions to outward corporate actions demands further opening up of the internal reasoning of both business and other water actors such as NGOs.

Beyond these identified gaps, two further research areas have been beyond the scope of this review, but also deserve attention. First, more research is needed on the links between water and other environmental-sustainability and social-responsibility aspects and on how businesses can most effectively address water among the plethora of issues that demand their attention. While a distinct focus on water by business is merited for various reasons that are detailed in this review and elsewhere, some analyses (such as van Duuren et al., 2016; Hogeboom et al., 2018) and initiatives have started to integrate water with other thematic areas of corporate sustainability work including climate, biodiversity, labour, gender and human rights. A view is emerging that, once the initial water risk, opportunity, and impact assessments have been made, it may be more beneficial to incorporate water into work on other thematic areas rather than to address it as an isolated matter (see, for example, Sojamo et al., 2021). Studying water can reveal the close linkages between the different aspects of business sustainability; it thus can strengthen the overall work in all the topic areas. The NGOs and donors driving the corporate water initiatives could play a key role in this integration, demonstrating its value and guiding companies in developing more holistic strategies. On a related note, the scholarship on corporate water stewardship and water security engagement could benefit from greater cross-fertilisation with scholarship in other closely related research fields, including in the broader field of environmental stewardship (see, for example, Kalfagianni et al., 2020), as well as literature in the field of water infrastructure and services partnerships between government, private entities and civil society organisations (Lima et al., 2021), and scholarship in the field of corporate social responsibility in the water industry (Figueora et al., 2022).

The second research area that is deserving of attention is the (missing) incentives of the public sector to take the lead in addressing the water issues of our time. While this paper has reviewed corporate involvement, the literature reiterates that the public sector – under whose mandate water continues to fall – needs to undertake a stronger role in steering and regulation. This effort needs to cover the whole impact and influence of water-using businesses. It needs both to build on the expertise of the research community and civil society and to be informed by the perspectives of committed corporations.

To sum up, this review shows that in the past 15 years the field of corporate engagement in water policy and governance has matured in both theory and practice. Our review further shows, however, that it is still a contested space and that many of the originally identified controversies are still relevant. As such, moving forward, a critical outlook continues to be needed as companies keep playing their part in addressing the water challenges of today and tomorrow.

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