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Oliver Wyman



# Nature Positive: Role of the Cement and Concrete Sector

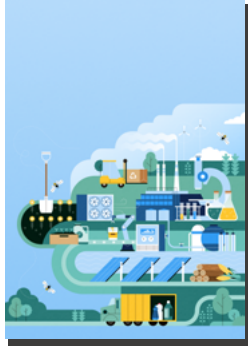
INSIGHT REPORT  
SEPTEMBER 2023



## Part of the World Economic Forum's *Sector Transitions to Nature Positive* report series, 2023



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# Forewords



**Nollaig Forrest**  
Chief Sustainability Officer,  
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Population growth and urbanization are driving the construction of cities equivalent to the size of New York City every month.<sup>1</sup>

Cement is a key ingredient in concrete, which is the most used construction material because it is local, affordable, versatile, recyclable, high-performing and resilient. Concrete is essential to this rapid rate of urbanization and population growth, ensuring that everyone has access to vital infrastructure, including housing, roads, hospitals and schools.

But getting the materials to produce cement and concrete is putting increased pressure on our planet and its natural resources. Today, the resources society is using are equivalent to that of 1.75 Earths<sup>2</sup> and 1 million species are at risk of extinction.<sup>3</sup>

Governments and industries are increasingly realizing that addressing nature and biodiversity concerns also addresses climate change mitigation and adaptation priorities. Nature is the new climate and the business case for integrated action across climate and nature has never been clearer.

Our sector's activities are impacting the ecosystems that we and all other species depend on. That's why we need transformational change by all actors – and we need it now. Business is fundamental to achieving the change needed. With its enormous economic power and environmental impact, business can lead the way – pushing for the outcomes people and the planet need.

Although cement and concrete companies are quickly recognizing and minimizing their heavy reliance on natural resources, we as a sector urgently need to do more.

As leaders in this sector, it is down to us to ensure bold and visionary action to achieve a net-zero, circular and nature-positive future. At Holcim, we have made ambitious commitments to nature for freshwater use and biodiversity. For example, we have committed to a 33% reduction in freshwater withdrawal per tonne of cement produced and to a measurable positive impact on biodiversity by 2030.

No one company can do this alone. Our collective actions, coupled with regulation in some countries, are leading to positive shifts. But as we increase our efforts to help meet the goals and targets of the Kunming-Montreal Global Biodiversity Framework, we can and must do more to embrace new technologies and ways of doing business.

This report clearly defines the priority actions our sector must take to embrace sustainable practices, from reducing greenhouse gases and curbing freshwater use to stepping up rehabilitation approaches and biodiversity management and expanding circularity efforts across the value chain. The transition to a nature-positive future also presents us with commercial opportunities, such as recycled concrete elements and structures. With the right policies and financing incentives, the sector is positioned to capture the full potential of a new circular and regenerative business model.

By prioritizing the actions in this report, we can build an industry that both constructs our lived environment and lays the groundwork for a thriving and harmonious coexistence with nature.





**Man does not weave this web of life. He is merely a strand of it. Whatever he does to the web, he does to himself.**

Chief Seattle, Indigenous Leader of the Suquamish and Duwamish people



**John T. Colas**  
Partner and Vice-Chairman,  
Financial Services America,  
and Global Co-head,  
Climate and Sustainability,  
Oliver Wyman



**Akanksha Khatri**  
Head, Nature and Biodiversity,  
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On 6 July 2023, Earth recorded its hottest day on record, according to the World Meteorological Organization, during what is expected to be the hottest month ever. And 2023 is well on its way to becoming the hottest year. Ocean temperatures are higher than they have ever been in modern times, leading to rising sea levels, more intense storms and faster-than-usual ice loss in the Arctic in June, according to the National Snow & Ice Data Center in the US.

All this heat is taking a toll on people and nature. Thousands of people are dying from prolonged heatwaves, while the loss of habitats and breeding grounds accelerates on land and at sea. The World Economic Forum's *New Nature Economy Report* estimates that more than half the world's gross domestic product (GDP) is moderately or highly dependent on nature and its services, meaning companies and investors cannot afford to delay actions to reverse climate change and prevent nature loss any longer. The world is at a tipping point and only aggressive action can pull it back from unimaginable suffering.

While the 2015 Paris Agreement and the 2022 Kunming-Montreal Global Biodiversity Framework have provided governments and businesses with goals and targets, industries need sectoral guidance on strategic ways forward. This is particularly true when it comes to preventing nature loss, which poses an inherently complex set of issues to tackle.

The World Economic Forum, in collaboration with Oliver Wyman, has spent the past year gathering data and insights through research, expert consultation and industry interviews that have enabled us to prepare the *Sector Transitions to Nature Positive* series of reports. These focus on three sectors: chemicals, household and personal care products, and cement and concrete. This initiative is part of a broader collaborative effort with Business for Nature and the World Business Council for Sustainable Development.

Halting climate change and nature loss are inextricably intertwined. Therefore, corporate and investor action to address these twin challenges must also be complementary and push forward simultaneously. Investing in nature is more than just good risk management. Companies that take bold steps today towards a net-zero, nature-positive business model will undoubtedly enjoy competitive advantages. This will stem from more resilient and sustainable supply chains, a positive public image, innovative green products and greater support from the financial sector.

If we are to stay within safe and just Earth system boundaries and maintain a sustainable planet, there is no time to delay.

# Executive summary



Today, the resources humanity is using are equivalent to that of 1.75 Earths.<sup>4</sup> Humans have exceeded seven out of eight globally quantified safe and just Earth system boundaries and risk crossing irreversible tipping points.<sup>5</sup>

As the second most consumed material in the world after water, and with no scalable substitutes currently available, concrete is a critical construction material for society and cement is a key input in its production.<sup>6</sup> With the global urbanization rate projected to reach 68% by 2050,<sup>7</sup> concrete production is likely to continue growing to meet the demand for residential buildings and public infrastructure.<sup>8</sup> Consequently, it is imperative for cement and concrete companies to continue and accelerate their journey towards a nature-positive and net-zero future, and to ensure they operate within the Earth's safe and just system boundaries.<sup>9</sup>

The call for the transition to “nature positive” has never been louder. In 2022, 196 parties signed up to the Kunming-Montreal Global Biodiversity Framework (GBF), with the global goal to halt and reverse nature loss by 2030 and full recovery by 2050. A global, legally binding treaty to address plastic pollution will come into force at the end of 2024.<sup>10</sup> Meanwhile, regulators are moving towards mandatory nature-related disclosures from companies.

The nature-positive transition is synergistic to companies' net-zero commitments. Nature-based solutions can contribute up to 37% of the emissions reductions required by 2030 to keep global temperature increases below 2 degrees Celsius.<sup>11</sup> Accordingly, companies need solutions to address climate change and nature loss together.

Cement and concrete companies can seize this opportunity to further align themselves with emerging regulation, proactively manage nature-related risks, and build a sustainable and resilient supply chain that can benefit from opportunities in the transition.

In some jurisdictions,<sup>12</sup> companies in the sector already operate under stringent regulatory controls, for example around mandatory quarry rehabilitation plans, air emissions or waste management. Many corporate leaders have made commitments on climate and nature<sup>13</sup> and sectoral sustainability initiatives have been established, such as the sustainability charter of the Global Cement and Concrete Association (GCCA), whose members represent 80% of the global cement industry's volume outside of China.<sup>14</sup>

While these efforts are welcome, more needs to be done. The sector continues to contribute to drivers of nature loss, such as greenhouse gas emissions, freshwater withdrawal and ecosystem disturbance due to quarrying activities.

This document summarizes the sector's key impacts and dependencies on nature and sets out sector-specific actions that corporate leaders can start to take now to transform their businesses. The cement and concrete sector has a key role to play in halting and reversing nature loss by 2030 – the mission at the heart of the GBF. Priorities include the following:

#### **1. Improve water stewardship across the value chain**

Complementing their ongoing initiatives, cement and concrete companies can continue to reduce their dependence on freshwater and their impact on its availability and quality, especially in regions where they are facing water risk. Solutions include water audits, sustainable water management plans<sup>15</sup> and using non-freshwater sources such as harvested rainwater. Companies can also establish closed-loop recycling systems at production sites and create artificial wetlands to reduce water withdrawal and improve water quality.

#### **2. Adopt technologies and manufacturing practices to reduce greenhouse gas emissions and other airborne emissions**

Companies in the sector are already working to reduce their greenhouse gas and other airborne emissions.<sup>16</sup> Solutions include switching to renewable energy (including sustainable alternative fuels), developing substitutes for carbon-intensive clinker, retrofitting facilities with emissions-reduction technologies, such as carbon capture, utilization and storage (CCUS), and investing long-term in innovative technologies, such as green hydrogen and kiln electrification. An enabling policy environment, supporting infrastructure and multistakeholder collaboration are also pivotal in helping companies follow through on their commitments.

#### **3. Continue and strengthen reclamation and rehabilitation approaches, biodiversity management of quarries and land stewardship**

Companies should consider biodiversity management and rehabilitation programmes for both operational and inactive quarries. This offers a unique opportunity for cement and concrete producers to contribute to nature in a positive way, as it helps with species recovery and the restoration of degraded habitats.

Companies can measure their positive impact with tools such as the biodiversity indicator and reporting system (BIRS) developed by the International Union for Conservation of Nature (IUCN). They should engage with environmental organizations such as IUCN, Fauna & Flora International (FFI) and BirdLife International to develop biodiversity management standards and guidance to influence the whole industry. Companies can also implement biodiversity management plans on all the land they occupy, including offices, plants and storage yards, particularly when sites are located in regions rich in biodiversity.

#### **4. Expand circularity efforts across the value chain**

Cement and concrete companies are already contributing to waste management through “co-processing” in kilns, which involves recovering energy from waste. In addition, there is a significant opportunity for the sector to make more positive contributions to nature through circularity. For example, entire concrete elements and structures can be recycled. Construction and demolition waste can be reused as aggregate and in other valuable applications, as standards and policies evolve. Companies can capture and recirculate CO<sub>2</sub> emissions in the value chain; similarly, the reuse of water is increasingly common. With more supporting policies, good initial building planning and design, thoughtful renovations and demolitions and careful life-cycle analysis of the environmental impact, the potential of circularity in the built environment can be fully captured.

#### **5. Accelerate innovation to offer products that support the nature-positive transition**

Developing and introducing new concrete mixes and cement blends can be a key solution. For example, businesses can change the feedstock needed for cement production to more sustainable materials using cement additives such as slags, fly ash and pozzolans. Additionally, companies can expand their product and service portfolios to introduce new offerings, especially downstream, such as waste processing and recycling. These will offer new business opportunities. New products can also contribute to nature-based solutions, such as using concrete in coral reef restoration following a careful analysis of the benefits and impacts.

**These priority actions could unlock \$44 billion in annual business opportunities by 2030** for companies operating across the sector's value chain, presenting a significant opportunity for the cement and concrete sector in the new nature-positive economy.



1

# Introduction

Most of the world's top 500 companies have a climate target – but just 5% have one for biodiversity. Given how dependent the global economy is on nature, the private sector urgently needs to help halt and reverse nature loss this decade.





“ 37% of the emission reductions required by 2030 to keep global temperature increases under 2 degrees Celsius will come from nature-based solutions.

Nature is at a tipping point. Today, the resources humanity uses are equivalent to that of 1.75 Earths.<sup>17</sup> This means that the ecological footprint, a measure that sums up the demands for biologically productive areas like food, timber, fibre, carbon sequestration and infrastructure, exceeds the Earth’s capacity by 75%.<sup>18</sup>

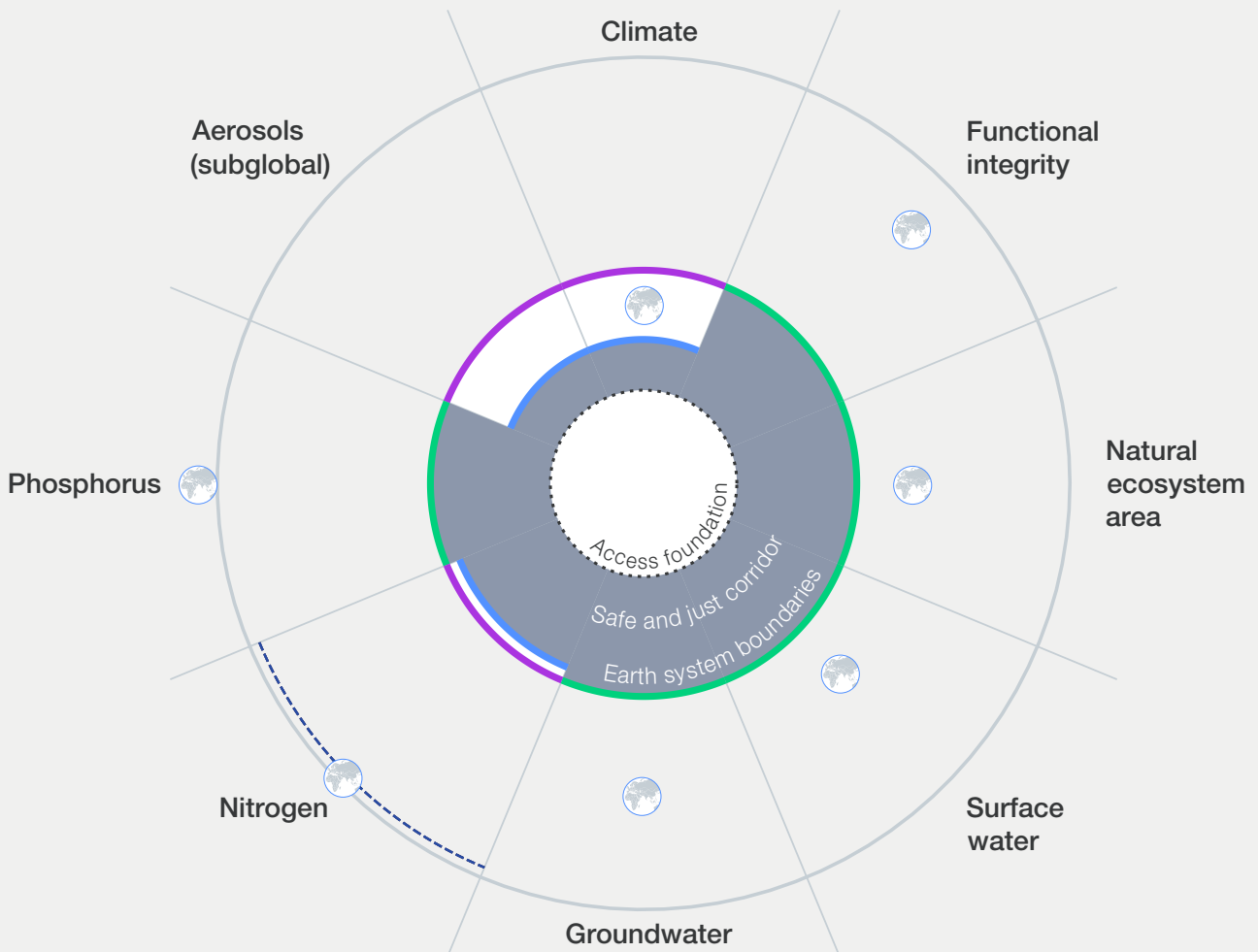
Achieving net-zero emissions and tackling nature loss are two priorities, both for society and business, that are highly interdependent. Climate change is one of the five key drivers of biodiversity loss, according to the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES).<sup>19,20</sup> Land-use change, principally agricultural commodity-driven deforestation, contributes 12–20% of global greenhouse gas emissions.<sup>21</sup> At the same time, efforts to tackle climate change cannot succeed without safeguarding nature. It is estimated that 37% of the emission reductions required by 2030 to keep global temperature increases under 2 degrees Celsius will come from nature-based solutions.<sup>22</sup>

There is now global agreement that climate, biodiversity, surface water and groundwater are all components of the Earth’s vital systems<sup>23</sup> and climate goals cannot be reached without healthy

and resilient nature. Razan Al Mubarak, UN Climate Change High-Level Champion for the United Nations Climate Change Conference (COP28) and Co-Chair of the World Economic Forum Champions for Nature community, acknowledged this in June 2023 when she declared that nature is “not ornamental, but fundamental” in the quest for a net-zero emissions and resilient future.<sup>24</sup> Standard setters have also begun to recognize the relationship between climate change and nature and are increasingly looking to align efforts, as seen in the linkages between the Science Based Targets initiative (SBTi) Forest, Land and Agriculture (FLAG) targets<sup>25</sup> and the targets for land from the Science Based Targets Network (SBTN).<sup>26</sup>

In May 2023, the Earth Commission published the first quantification of safe and just Earth system boundaries, developed by more than 40 researchers worldwide.<sup>27</sup> The eight boundaries encompass aerosols, biosphere, climate, freshwater and nutrients at global and local levels. Staying within these boundaries will require a transformation of societies and the global economy.<sup>28</sup> Seven of them have already been exceeded, including the boundaries for natural ecosystem area, groundwater and surface water (see Figure 1).

FIGURE 1 Safe and just Earth system boundaries



Current global states
 Safe Earth system boundaries
 Just Earth system boundaries
 Cases where safe and just boundaries align

Source: Rockström, J. et al.<sup>29</sup>

# 1.1 Why nature matters for businesses

The importance of nature is swiftly rising for businesses in the real economy, as well as for the financial services industry and investors. The evidence for rising nature-related risks is mounting: in the *Global Risks Report 2023* by the World Economic Forum,<sup>30</sup> six out of the top ten risks are environment-related. Natural disaster, biodiversity loss and ecosystem collapse, as well as natural resource crises, were identified as the third, fourth and sixth most pressing global risks over the next decade, respectively. In parallel, the calls for rapid

change are getting stronger and more frequent, coming from policy-makers, regulators, investors, companies, consumers and citizens (see Figure 2).

Companies that can get ahead of the risks from nature loss can minimize disruption from incoming policy and regulatory requirements, proactively manage nature-related physical, transition and systemic risks,<sup>31</sup> and benefit from early opportunities to move towards nature positive.

FIGURE 2 Key nature-related dynamics impacting businesses<sup>32</sup>



## The Kunming-Montreal Global Biodiversity Framework (GBF)

The agreement of the GBF in December 2022<sup>33</sup> set the ambition to halt and reverse biodiversity loss, calling for a collective effort from all sections of society on the four goals and 23 targets by 2030. The GBF charts the path for biodiversity, in the same way the 2015 Paris Agreement did for climate change.

The GBF is expected to influence business action<sup>34</sup> through policy, regulation and financial incentives, especially Target 15 on mandatory assessment

and disclosure, Target 16 on supportive policies for sustainable consumption choices, reducing overconsumption and waste generation, and Target 18 on eliminating environmentally harmful subsidies and aligning incentives.

## Guidance and standards

Many regulators will soon require mandatory nature-related disclosure from companies. For example, the European Sustainability Reporting Standards (ESRS) under the Corporate Sustainability Reporting Directive (CSRD)<sup>35</sup> of the European Union (EU) will

“ In the past two years, 140 financial institutions with €19.7 trillion in assets under management, have signed the Finance for Biodiversity Pledge.

“ 64% of Gen Zs say they would pay more to purchase an environmentally sustainable product.

require companies in scope to disclose specific metrics for their *impact* on nature and biodiversity, as well as for their *exposure* to nature and biodiversity loss. The EU Taxonomy for Sustainable Activities has already identified activities such as “the protection and restoration of biodiversity and ecosystems” and “the sustainable use and protection of water and marine resources”.<sup>36</sup>

Other nations are also introducing similar standards and regulations. For example, companies in India<sup>37</sup> are required by law to adequately identify, monitor and manage environmental risks and disclose material information, and must report on direct and indirect impacts on biodiversity in ecologically sensitive areas.

In July 2023, the International Sustainability Standards Board (ISSB) of the International Financial Reporting Standards (IFRS) Foundation published the General Requirements for Disclosure of Sustainability-related Financial Information (IFRS S-1) and the Climate-related Disclosure (IFRS S-2). Soon, ISSB may require companies to provide additional transparency on impacts and risks related to natural ecosystems and the just transition, according to ISSB’s Chair Emmanuel Faber.<sup>38</sup> It is expected that ISSB’s standards will be adopted by regulators and made mandatory in some jurisdictions in the near future.

Companies are encouraged to start collecting data and build internal capacity according to voluntary disclosure frameworks to get ahead of the curve. For example, the Taskforce on Nature-related Financial Disclosures (TNFD) has been engaging companies over the past year and has developed guidance for companies to assess and disclose their impacts, dependencies, risks and opportunities associated with nature.<sup>39</sup>

## Financial institutions and investors

Existing and prospective investors and other financial institutions are also taking actions on nature. In the past two years, 140 financial institutions with €19.7 trillion in assets under

management have signed the Finance for Biodiversity Pledge.<sup>40</sup> Institutional investors are convening through the Nature Action 100 programme to engage with companies and policy-makers on nature.<sup>41</sup>

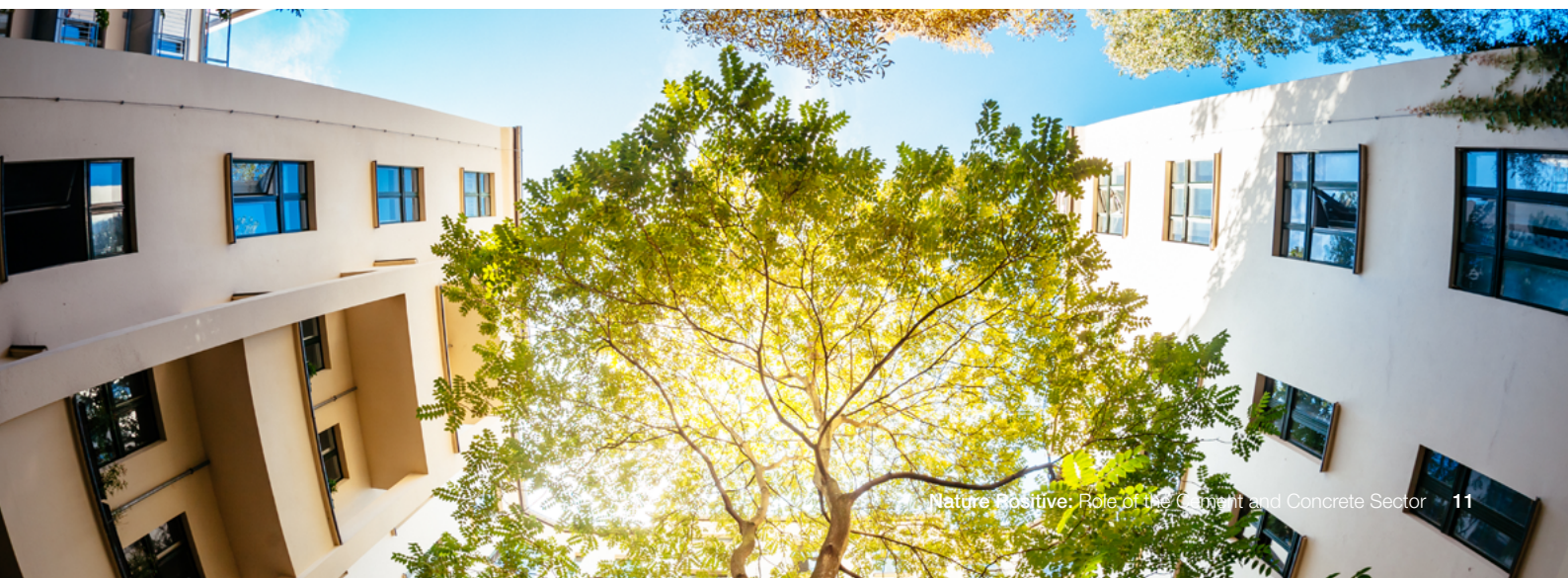
Financial institutions can play an important role in the nature-positive transition, by regularly screening and assessing investor portfolios for biodiversity risks, engaging with high-risk investees and mobilizing internal and external stakeholders (especially clients), developing investment policies and strategies, and sharing lessons and engaging in relevant initiatives such as TNFD and the Science Based Targets Network (SBTN).<sup>42</sup>

## Consumers and employees

Similarly, wider society and other stakeholders, such as employees and consumers, are raising their expectations for corporate action to protect nature and biodiversity.

In the Union for Ethical BioTrade’s 2022 Biodiversity Barometer,<sup>43</sup> loss of biodiversity was the second most urgent environmental concern for consumers after climate change. In countries such as Brazil and China, the concern comes out on top, with 54% of consumers wanting information on a product’s impact on biodiversity. A survey by Simon-Kucher & Partners in 2021 showed that 85% of consumers have made changes to their purchasing behaviour in the past five years to become more sustainable.<sup>44</sup> Similarly, a survey conducted by Nielsen in 2018 indicated that over 81% of consumers worldwide feel strongly that companies should help improve the environment.<sup>45</sup>

Additionally, employees are elevating their expectations regarding their employers’ commitment to protecting nature and biodiversity. For example, a global survey by Deloitte in 2022<sup>46</sup> found that protecting the environment remains a top priority for Gen Zs and millennials. They want to see their employers prioritize visible actions that enable employees to get directly involved, while 64% of Gen Zs said they would pay more to purchase an environmentally sustainable product.





## 1.2 The current approach to nature and biodiversity

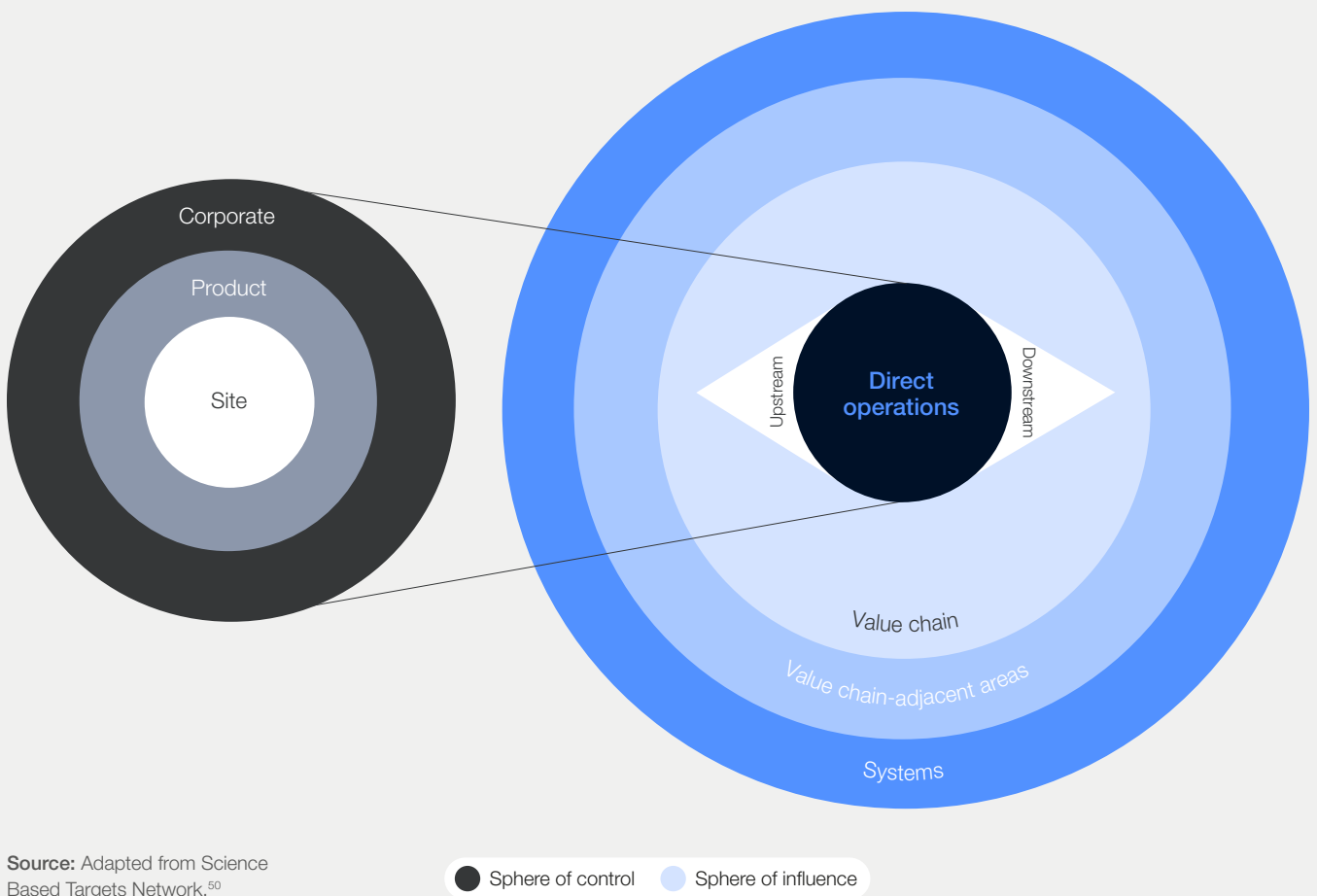
“ While 83% of Fortune Global 500 companies have climate change targets, only 25% have freshwater consumption targets and just 5% have targets for biodiversity loss.

Despite the increased momentum on nature over recent years, not enough is being done. While 83% of Fortune Global 500 companies have climate change targets, only 25% have freshwater consumption targets and just 5% have targets for biodiversity loss.<sup>47</sup> Only 5% of companies have assessed their impacts on nature, with less than 1% understanding their dependencies.<sup>48</sup>

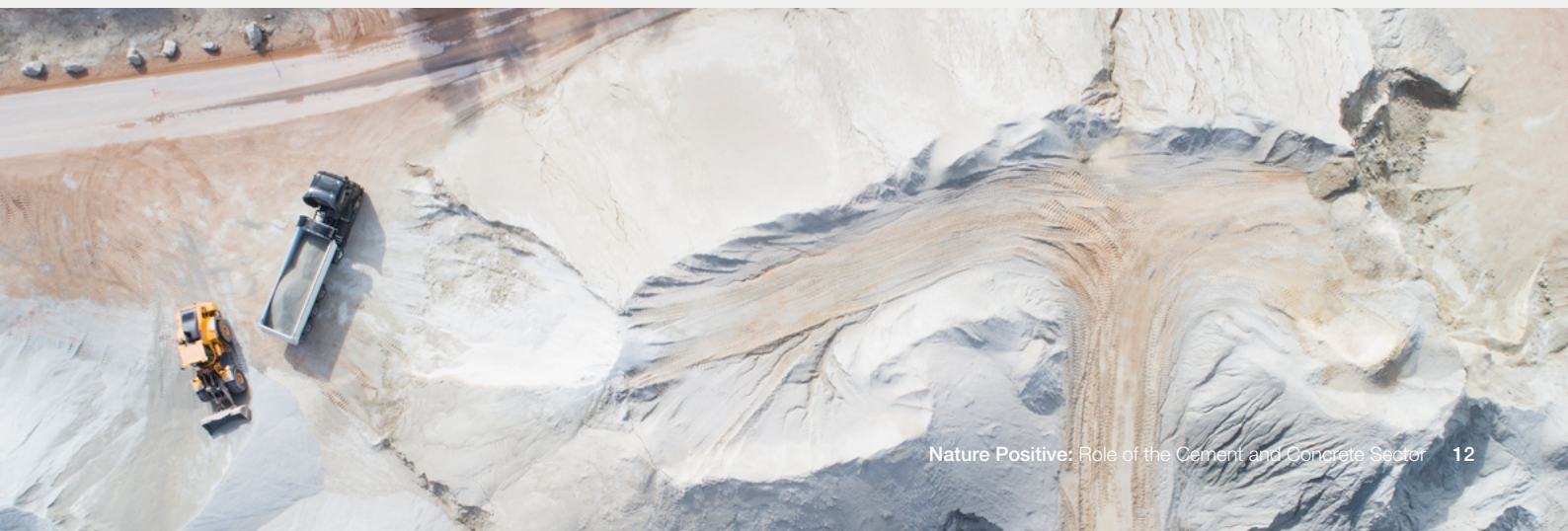
According to Business for Nature, “nature positive” represents a “global goal to halt and reverse nature loss by 2030 with a view of full recovery by

2050.”<sup>49</sup> Individual companies, financial institutions and investors can contribute to this shared goal by adopting nature-positive strategies across their spheres of control and influence, including at sites of high-biodiversity importance, in their direct operations as well as across their value chains (see Figure 3).

FIGURE 3 Spheres of control and influence



Source: Adapted from Science Based Targets Network.<sup>50</sup>





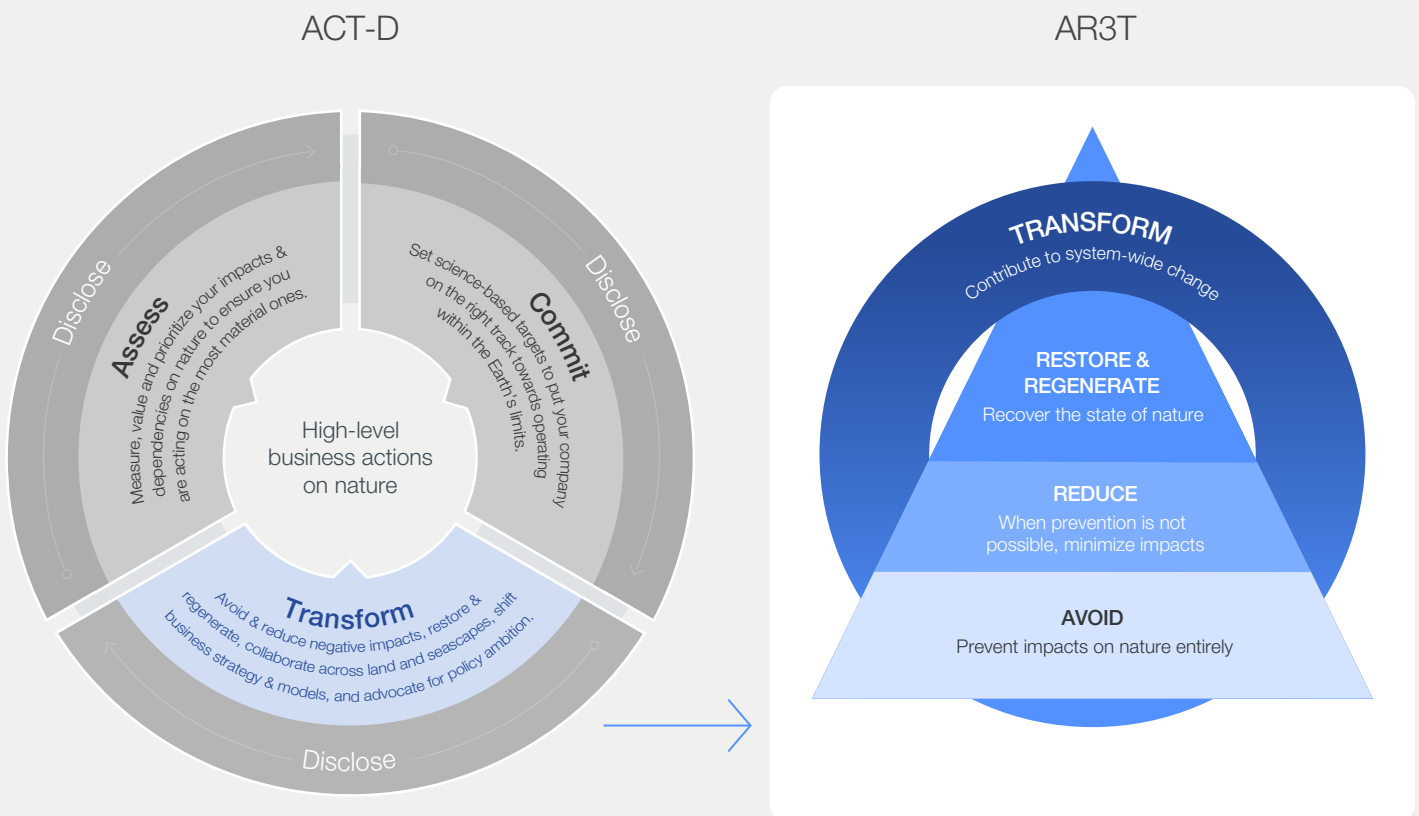
Nature is inherently complex and hence cannot be measured with a single metric or methodology. IPBES and SBTN define nature as “all non-human living entities and their interaction with other living or non-living physical entities and processes”.<sup>51</sup> TNFD defines nature as encompassing four realms – land, ocean, freshwater and atmosphere – with biodiversity being “an essential characteristic of nature that enables ecosystem assets to be productive, resilient and able to adapt to change.”<sup>52</sup>

Nature is also location-specific and not replaceable or fungible, making well-conceived actions all the

more urgent. For instance, a tonne of CO<sub>2</sub> has the same impact on the atmosphere regardless of where it is, but the ecological value of a tree in the Amazon rainforest is not the same as that of a tree in the boreal forests.<sup>53</sup>

This report builds on the ACT-D high-level business actions developed by the global coalition Business for Nature: Assess, Commit, Transform and Disclose,<sup>54</sup> and the AR3T (Avoid, Reduce, Restore & Regenerate, Transform) mitigation hierarchy developed by the SBTN<sup>54</sup> (see Figure 4).

FIGURE 4 ACT-D high-level business actions on nature and AR3T framework



Source: Business for Nature and Science Based Targets Network.<sup>56</sup>

As per the **ACT-D framework**, businesses can and should act now to:

- **Assess:** Measure, value and prioritize their impacts and dependencies on nature to ensure they are acting on the most material ones.
- **Commit:** Set science-based targets to put themselves on the right track towards operating within the Earth's limits.

- **Transform:** Avoid and reduce negative impacts, restore and regenerate, collaborate across land and seascapes, shift business strategy and models and advocate for policy ambition.
- **Disclose** material nature-related information across all three high-level actions above.<sup>57</sup>

This report focuses on the Transform element of the ACT-D framework and outlines concrete sector-specific actions that companies are encouraged to take to contribute to the transition to nature positive.

It is important that these priority actions also follow the SBTN's **AR3T framework**, which encourages businesses to:

- **Avoid** and **Reduce** the pressures on nature loss, which would otherwise continue to grow

- **Restore** and **Regenerate** so that the state of nature can recover

- **Transform** underlying systems, at multiple levels, to address the drivers of nature loss<sup>58</sup>



## 1.3 The road ahead

Climate action has already laid a lot of the groundwork for nature and biodiversity action, but companies and financial institutions should now mobilize on a much shorter timeline and with greater urgency.

The World Economic Forum, along with Business for Nature and the World Business Council For Sustainable Development (WBCSD), is building out sectoral knowledge to support companies to prioritize their actions to contribute to nature positive. As nature impacts and dependencies differ significantly across real economy sectors, it is important to provide tailored, sector-specific analyses and guidance for companies to understand their relationship with nature and take actions. A repertoire of executive summaries of all sectoral guidance can be found on the Business for Nature website.<sup>59</sup>

The World Economic Forum, in partnership with Oliver Wyman, has conducted in-depth analyses of three sectors: chemicals, cement and concrete, and household and personal care products. This report identifies and makes a business case for sector-specific priority actions for the cement and concrete sector.

Business and finance do not operate in a silo. They need to take shared accountability and collaborate with many stakeholders – including governments, employees and citizens – towards the collective goal of a net-zero, nature-positive and socially equitable economy. With this in mind, the priority actions presented in this guidance are not designed to provide a complete and comprehensive pathway to reach the nature-positive goal, but will contribute to progress towards that goal. Transitioning from current systems to a new economic model necessitates a rethinking of many existing processes. However, it is crucial that this transformation does not exacerbate inequalities across different regions and socio-economic groups.

2

# Where the sector is today

As members of a sector essential to the growth of cities and economies, cement and concrete companies need to transform their business models to align with the global nature-positive and net-zero transition.





## 2.1 Sector overview

Concrete, with cement as a key input, is a critical construction material for societies. It is the second most consumed material in the world after water, with no scalable substitutes today.<sup>60</sup> Given the global urbanization rate is projected to reach 68% by 2050, concrete production is expected to continue expanding to meet demand for residential and commercial buildings and public infrastructure.<sup>61</sup>

However, concrete and cement production has adverse impacts on nature. The sector is responsible for 7%-8% of global greenhouse gas emissions and 9% of worldwide industrial water withdrawals or 1.7% of total global water withdrawals. Considering the sector's projected growth, continued adoption of more sustainable practices in the sector is crucial as the world transitions to a nature-positive and net-zero economy.

### BOX 1 Definition of the cement and concrete sector

This report focuses on cement and concrete production as a sub-sector of the “construction materials” industry. Construction materials are defined within the Sustainability Accounting Standards Board (SASB)’s Sustainable Industry Classification System (SICS),<sup>62</sup> as follows: “Construction Materials entities have global operations and produce construction materials for sale to construction entities or wholesale distributors. These primarily include cement and aggregates, but also glass, plastic materials, insulation, bricks and roofing material. Materials producers operate their own quarries, mining crushed stone or sand and gravel. They may also purchase raw materials from the mining and petroleum industries.”

Concrete is a composite material made of cement, water and aggregates (e.g. sand, gravel, crushed stone, recycled concrete) and often includes amounts of admixtures (chemicals or additives that enhance specific properties of concrete). The exact mix and ratios as well as the type of aggregate used depend on how the concrete is intended to be used.<sup>63</sup>

Cement is a binding material that glues together the different components of concrete. Cement itself is a fine powder that is traditionally made by “first crushing and then heating limestone or

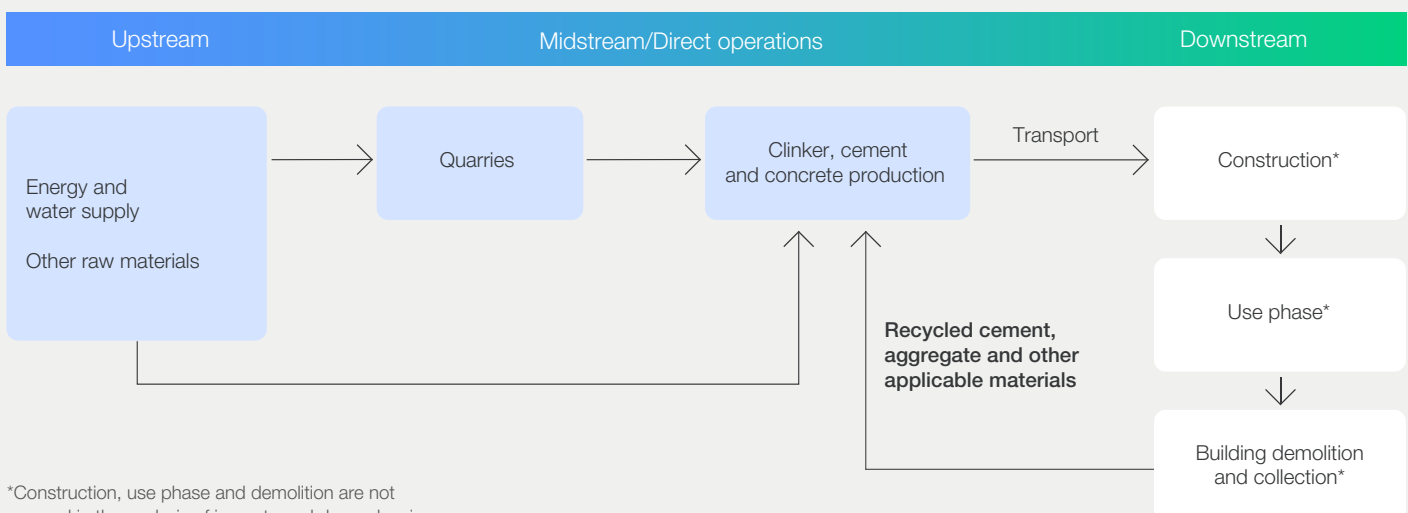
chalk, with a few other natural materials, including clay or shale, added.” These input materials are heated in a rotating kiln at temperatures of up to around 1,450 degrees Celsius, with the immediate output commonly referred to as clinker. To create cement, the clinker is ground up with a mix of other ingredients (e.g. gypsum) depending on the intended application of the cement. This type of cement is referred to as Portland cement, the most common type used in construction worldwide. Other cement types exist, where part of the clinker is replaced by other materials.<sup>64</sup>

The economies activities analysed in this report include the upstream sourcing of input resources and feedstock needed for cement and concrete, the midstream manufacture of cement and concrete and the associated materials (especially clinker), and the downstream disposal and recycling of applicable construction materials (especially waste from concrete).

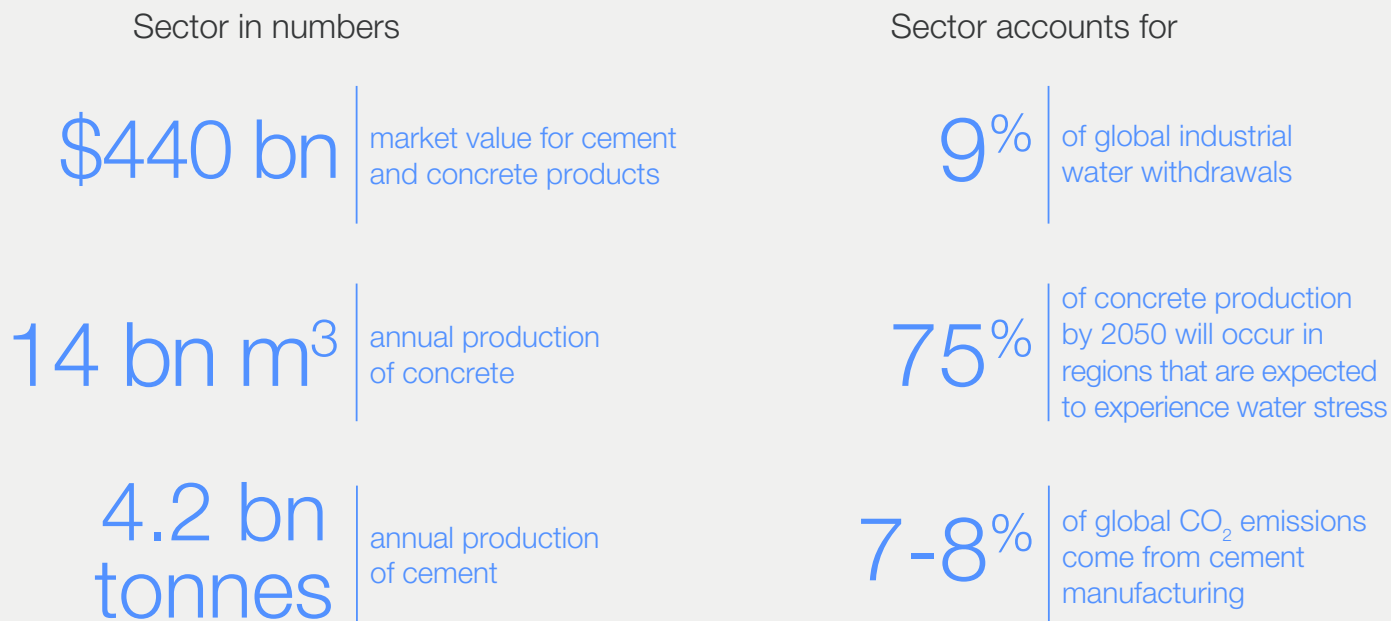
However, this report does not analyse the impacts and dependencies of downstream construction activities, use phase or demolition. For further guidance on the entire value chain, refer to the WBCSD *Roadmap to Nature Positive: Foundations for the Built Environment* report.<sup>65</sup>

“The sector is responsible for 7%-8% of global greenhouse gas emissions and 9% of worldwide industrial water withdrawals or 1.7% of total global water withdrawals.”

FIGURE 5 Simplified value chain of the cement and concrete sector







## 2.2 | Progress is promising but needs to accelerate

In some jurisdictions,<sup>67</sup> companies in the sector already operate under stringent regulatory frameworks and implement mandatory quarry rehabilitation plans, waste management and pollution control. Many corporate leaders in the sector have made climate and nature commitments. The Global Cement and Concrete Association (GCCA), which represents 80% of the global cement industry by volume outside of China, has identified five key pillars in its sustainability charter for members: (1) health and safety; (2) climate change and energy; (3) social responsibility; (4) environment and nature; and (5) circular economy. The GCCA has also developed a specific biodiversity and water policy.<sup>68</sup>

Leading companies in the sector already acknowledge their nature footprint and have committed to act. For example, in September 2021 Holcim launched its new nature strategy that commits the company to contribute to a nature-positive future, with measurable water and biodiversity targets.<sup>69</sup> Holcim was also selected to be an official member of the Taskforce for Nature-related Financial Disclosures (TNFD)<sup>70</sup> and more recently was one of 17 companies selected by the Science Based Targets Network (SBTN) to pilot their new science-based target for nature framework.<sup>71</sup> Meanwhile, as part of its water-positive approach to production, Dalmia Cement

conserved or harvested almost 14 times as much water as it consumed and recycled 31% of used water from 2022 to 2023.<sup>72</sup> Heidelberg Materials intends to have biodiversity enhancement plans for all its retired quarries by 2030.<sup>73</sup> New opportunities beckon: Cemex, for example, has invested in a clean energy start-up to transform solid waste into synthesized gas.<sup>74</sup> Rudus, a Finnish building materials company and part of the CRH group, has committed to assessing its impacts on nature throughout its value chain and setting science-based nature targets for its operations in line with SBTN's guidance.<sup>75</sup>

While recognizing these efforts, more needs to be done. Corporate leaders should start now to Assess, Commit, Transform and Disclose – as per Business for Nature's ACT-D framework – in a more systematic way. As noted in the Introduction, companies need to: measure, value and prioritize their nature-related impacts and dependencies across their value chains to ensure they act on the most material ones; set transparent, time-bound, specific, science-based targets when material; take actions to transform their businesses; and track performance to publicly report material nature-related information. For more information on tools and guidance available for the ACT-D set of high-level actions, see Table 1.



TABLE 1 | Selected tools and guidance available for ACT-D high-level actions

|                         |  |
|-------------------------|--|
| <p><b>Assess</b></p>    | <p>Consult the <a href="#">Locate-Evaluate-Assess-Prepare</a> (LEAP) approach from the Taskforce on Nature-related Financial Disclosures (TNFD).<sup>76</sup></p> <p>Follow the technical guidance to <a href="#">assess</a> and <a href="#">prioritize</a> from the Science Based Targets Network (SBTN).<sup>77</sup></p>  |
| <p><b>Commit</b></p>    | <p>Follow the technical guidance to set science-based targets for <a href="#">freshwater</a> and <a href="#">land</a> from SBTN.<sup>78</sup></p> <p>Use <a href="#">Business for Nature's commitment list</a> to locate relevant commitments and connect corporate efforts to collective global action.<sup>79,80</sup></p> |
| <p><b>Transform</b></p> | <p>Take inspiration from the World Economic Forum's <a href="#">Sector Transitions to Nature Positive</a> series of reports;<sup>81</sup> invest resources and commit management to deliver against clear targets.<sup>82</sup></p>  |
| <p><b>Disclose</b></p>  | <p>Consult the <a href="#">final recommendations from TNFD</a> for nature-related risk management and disclosures, published in September 2023.<sup>83</sup></p>   |

**Note:** This table is non-exhaustive. For more tools and guidance, see Business for Nature's [High-level Business Actions on Nature](#).<sup>84</sup>





3

## Nature-related impacts and dependencies

Cement and concrete companies are contributing to nature loss. They need to continue and strengthen their sustainability efforts to mitigate risks facing a sector dependent on nature for its survival.

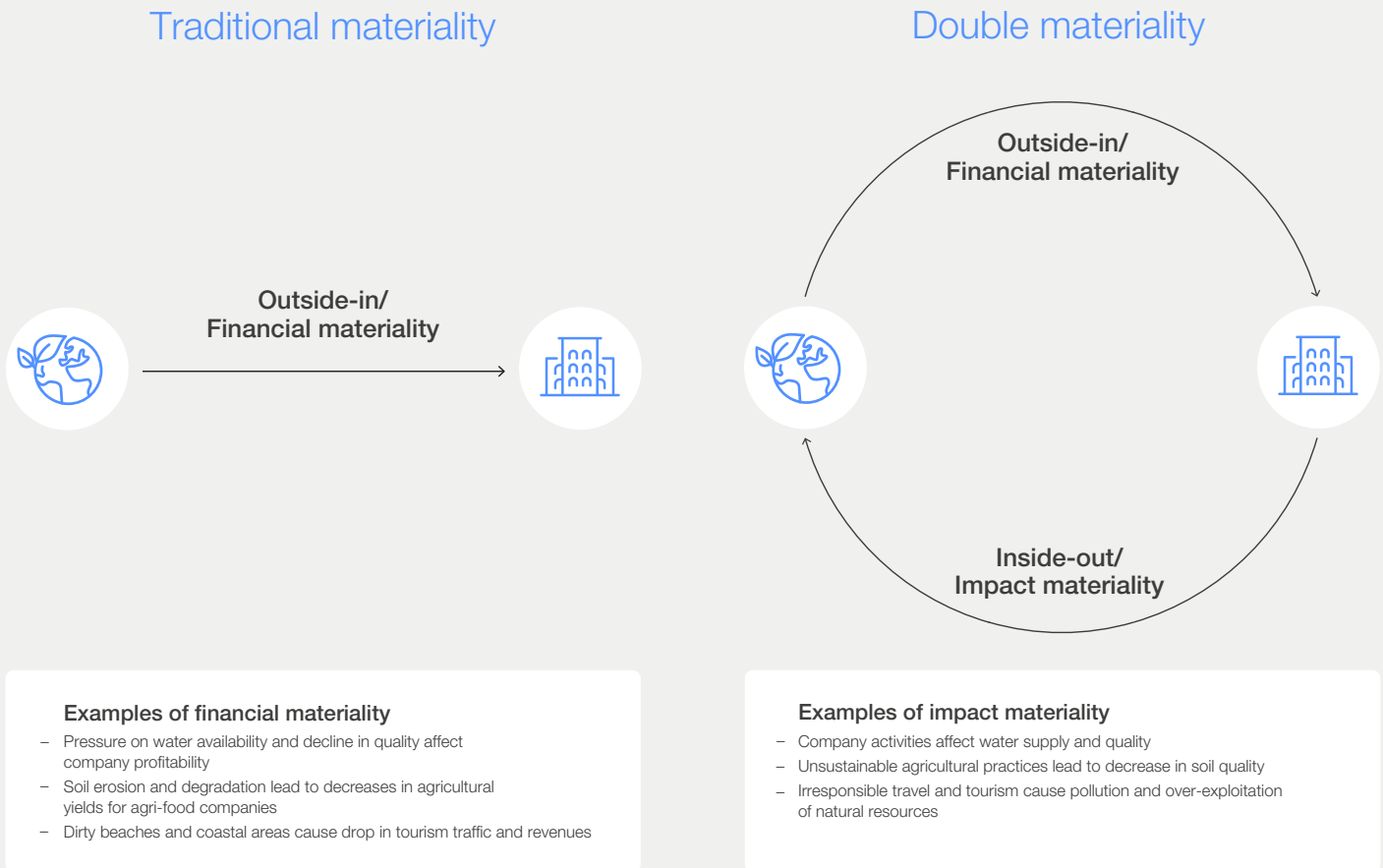


## 3.1 Double materiality

The principle of “double materiality”, a concept at the heart of the EU’s new CSRD, defines a company’s impact on the environment and its dependencies on it as highly interdependent (see Figure 7). In other words, the economic activities of businesses have impacts on both environment and

society (known as impact materiality or inside-out), while concurrently, businesses also encounter risks (and opportunities) arising from their dependencies on the environment and society (known as financial materiality or outside-in).

FIGURE 7 Double materiality



Source: World Economic Forum.<sup>85</sup>

Companies in the sector are dependent on freshwater for a range of activities related to the processing and manufacturing of cement. Water is a key ingredient in concrete. In addition, the sector uses natural resources to provide the materials required to manufacture cement.





The cement and concrete sector contributes to drivers of biodiversity loss as identified in the 2019

global assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES),<sup>86</sup> such as water and other resource use, land-use change and ecosystem disturbance, air pollution and greenhouse gas emissions. Cement and concrete companies should avoid and mitigate these impacts on nature loss in their operations and value chains.





FIGURE 8 | Top four drivers of nature loss in the value chain of the cement and concrete sector

|   | Upstream | Midstream/<br>Direct operations | Downstream |
|---|----------|---------------------------------|------------|
|  <b>Water and other resource use</b>              | ✓        | ✓                               |            |
|  <b>Land-use change and ecosystem disturbance</b> | ✓        | ✓                               |            |
|  <b>Air pollution</b>                             |          | ✓                               | ✓          |
|  <b>Greenhouse gas emissions</b>                  | ✓        | ✓                               | ✓          |

**Note:** Impacts related to construction, use phase and demolition are not in the scope of downstream activities and are not therefore analysed in this report. See methodology in the [Appendix](#).

BOX 2

**Conduct company-specific assessment of impacts and dependencies**

The analysis on impact and dependencies presented in Chapter 3 is a sector-average analysis for companies in the cement and concrete sector, but company-specific impacts and dependencies will vary according to their specific activities, supply chains and operational locations.

Companies will need to conduct assessments to locate their interface with nature and evaluate their dependencies and impacts using company-specific operational and supply chain information. TNFD’s LEAP approach,<sup>87</sup> as well as the SBTN’s Step 1 (screen and assess) and Step 2 (prioritize)<sup>88</sup> are useful frameworks to guide companies through their own assessment.

### 3.2 Water and other resource use

“ By 2050, 75% of the water demand for concrete production is expected to occur in regions likely to experience water stress.

The sector withdraws water across its entire value chain. Quarries for sourcing raw materials upstream are usually connected to local freshwater supplies. Most water withdrawal occurs during the midstream production of clinker, cement and concrete. In particular, water is used for cooling equipment and exhaust gases, for wet-process kilns (almost entirely replaced by more efficient dry-process technologies), for aggregate washing and for the manufacturing of concrete.

While activities such as agriculture<sup>89</sup> demand far more water, concrete production alone is responsible for 9% of global industrial water withdrawal or 1.7% of total global water withdrawal. By 2050, 75% of the water demand for concrete

production is expected to occur in regions likely to experience water stress.<sup>90</sup> Accordingly, the sector has a material impact on nature and has to carefully assess its dependencies and resulting implications, such as increased risk from water scarcity across many geographies.

In addition, the sector uses non-renewable natural resources to provide the materials required to manufacture cement (e.g. limestones, shale, clay) and to produce concrete (e.g. hard crushed rock, sand and gravel for aggregate). Global aggregate production is currently estimated at 40-45 billion metric tonnes,<sup>91</sup> with more than 50 billion tons of sand extracted globally every year.<sup>92</sup>

### 3.3 Land-use change and ecosystem disturbance

“ Unsustainable sand mining activity in the Mekong Delta in Viet Nam is driving coastal erosion and land infertility.

Although many companies are taking action to implement quarry rehabilitation and biodiversity management plans, quarrying activities continue to have an impact on local ecosystems and habitats. In addition, when improperly managed, dredging and coastal sand mining practices could result in critical habitat destruction, sediment suspension and loss of biodiversity.<sup>93</sup>

The exploitation of sand and gravel is another issue of concern.<sup>94</sup> While sand is an input resource for many manufacturing activities, the cement and concrete sector relies on the resource. Current extraction rates of sand exceed natural replenishment rates, leaving mined ecosystems very slow or even unable to recover.<sup>95</sup> The impact on nature is especially substantial in Asia, where demand for sand has grown significantly in recent

decades due to expanding construction activities. For example, unsustainable sand mining activity in the Mekong Delta in Viet Nam is driving coastal erosion and land infertility.<sup>96</sup> A 2022 report by the UN Environment Programme calls for sand to be recognized as a strategic resource due to its significant environmental, social and economic value.<sup>97</sup>

This offers a unique opportunity for cement and concrete companies to contribute to nature positive by helping to restore degraded habitats, recover species and achieve biodiversity gains. Moreover, GCCA member companies have adopted commitments to conduct sand extraction in a sustainable manner and are taking actions to define and execute quarry rehabilitation and biodiversity management plans.<sup>98</sup>

### 3.4 Greenhouse gas emissions

“ Cement accounts for up to 90% of the emissions of concrete, although it constitutes only 10-15% of concrete's mass.

The sector continues to be a large source of carbon dioxide (CO<sub>2</sub>). Cement manufacturing accounts for 7-8% of global CO<sub>2</sub> emissions. This is primarily due to the thermal combustion and chemical processes involved in the production of clinker. About 60-65% of CO<sub>2</sub> emissions in cement manufacturing result from the calcination of limestone, the main raw material in clinker. The thermal combustion process, which is typically fired with fossil fuels, is responsible for the remaining 35-40%.<sup>99</sup>

As a result, cement accounts for up to 90% of the greenhouse gas emissions of concrete, although it constitutes only about 10-15% of concrete's mass in a typical mix.<sup>100</sup> Given the indispensable

role of cement as a construction material and the continuous expansion of the built environment, especially in emerging economies, the sector urgently needs to further decrease the carbon- and energy-intensity of its products. In addition to action by companies, governments have a role to play in framing enabling policies and developing infrastructure (e.g. industries for green hydrogen) to support the sector. Innovation in carbon capture technologies and cement and concrete mixes is also essential to achieving net-zero targets in the sector.

### 3.5 Air pollution

The sector can also be a source of air pollution, particularly in countries where there is weak enforcement of regulations. Air pollution is primarily the result of emissions such as sulfur dioxide and nitrogen oxide released during the manufacturing of clinker and cement.<sup>101</sup>

Dust pollution resulting from quarrying activity in the upstream sourcing of raw materials also poses challenges. Dust formation can disrupt local ecosystems by decreasing the quality of land, contaminating plants and affecting the health of animals. Moreover, high volumes of water are needed to suppress dust clouds.<sup>102</sup>

4

# Five priority actions

By prioritizing water management, emissions reductions, land stewardship, circularity and innovation, the sector can unlock \$44 billion in additional annual value by 2030.



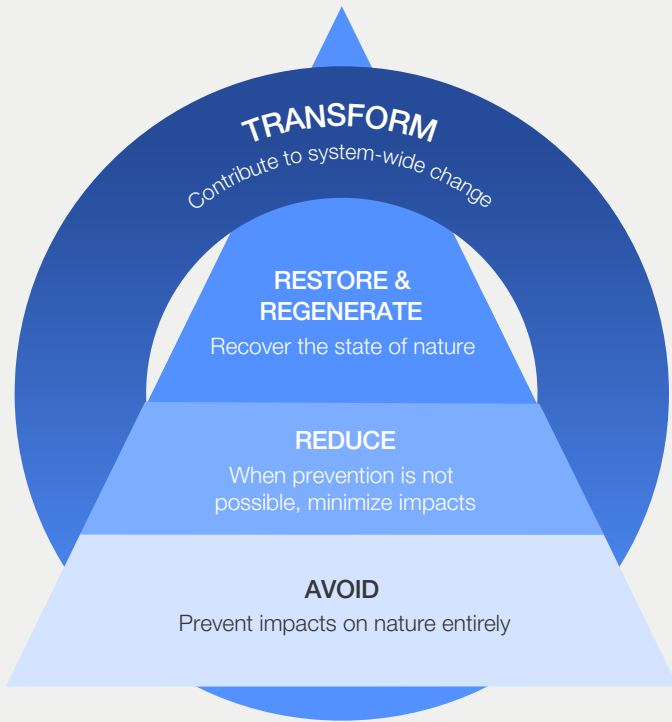


This report sets out five priority actions for the cement and concrete sector to complement its ongoing sustainability initiatives and accelerate its journey towards a nature-positive future.

Acknowledging that leading businesses in the sector are already employing or gradually rolling out many of these actions, this report calls for further

efforts from all cement and concrete companies worldwide to: 1) improve water stewardship across the value chain, 2) reduce greenhouse gas emissions and other airborne emissions, 3) continue and strengthen reclamation, rehabilitation and biodiversity management, 4) expand circularity across the value chain and 5) accelerate innovation to support the nature-positive transition.

FIGURE 9 Five priority actions for the cement and concrete sector



Priority Action 1

Improve water stewardship across the value chain

Priority Action 2

Adopt technologies and manufacturing practices to reduce greenhouse gas emissions and other airborne emissions

Priority Action 3

Continue and strengthen reclamation and rehabilitation approaches, biodiversity management of quarries and land stewardship

Priority Action 4

Expand circularity efforts across the value chain

Priority Action 5

Accelerate innovation to offer products that support the nature-positive transition

“Undertaking the five priority actions for this sector could unlock \$44 billion in annual cost savings and revenue upside by 2030.”

The transition to a nature-positive business model presents enormous opportunities for companies in the concrete and cement sector. The Forum’s *Future of Nature and Business* report estimates that a full nature-positive transition in the global economy could create \$10.1 trillion in annual business opportunities by 2030.<sup>103</sup>

Of this amount, estimates show that undertaking these priority actions for the cement and concrete sector could unlock \$44 billion in annual cost savings and revenue upside by 2030 for businesses operating across the sector’s value chain. In particular, efforts to move towards net-zero emissions and innovating the sector’s product offering present significant business opportunities.



BOX 3 Opportunity sizing methodology to arrive at the \$44 billion figure

The Forum's *Future of Nature and Business* report, published in 2020, identifies about 60 major business opportunities in the nature-positive economy and estimates their respective market sizes (defined as concentrated shifts in profit pools that generate specific opportunities for business). The sizing reflects the annual opportunity in 2030, based on estimated savings (e.g. value of land saved through restoration) or revenue upside (e.g. new market potential for new products). For each opportunity, the incremental size of the opportunity in a nature-positive versus a business-as-usual scenario is measured. The opportunities selected are based on existing, commercialized technologies.<sup>104</sup>

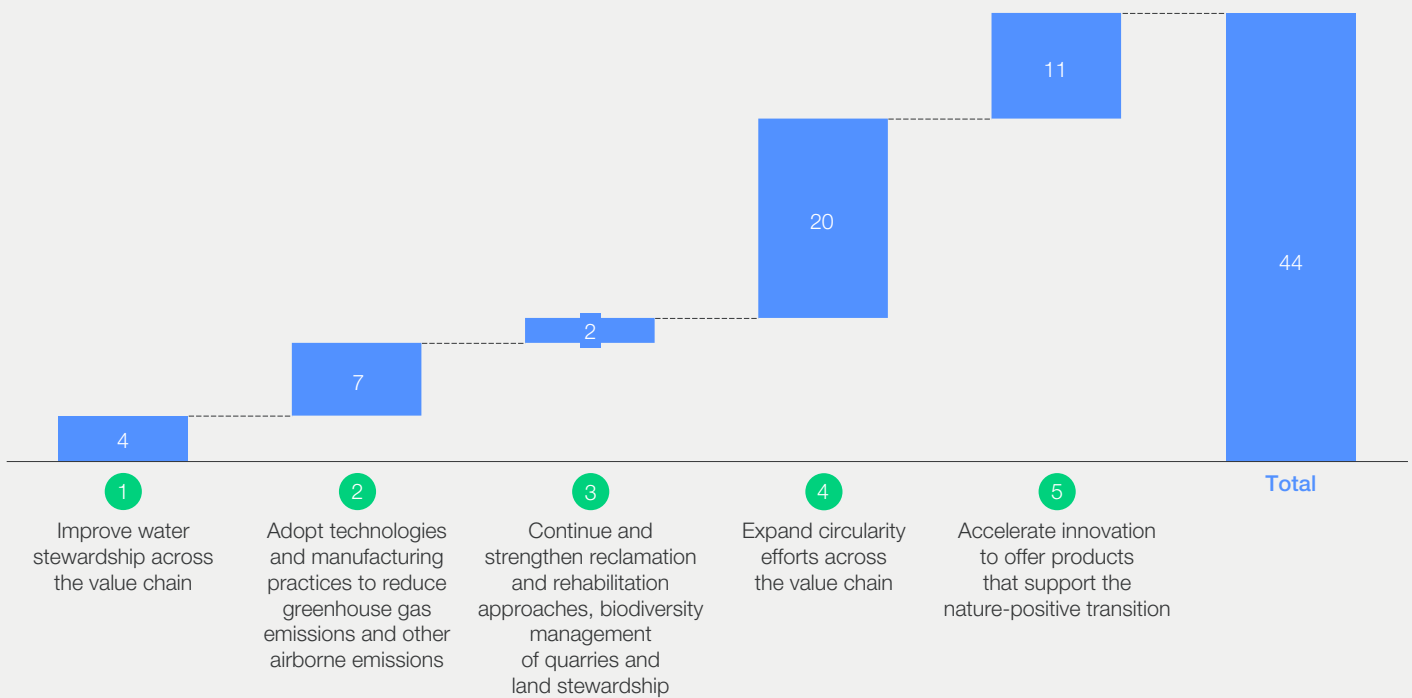
Identifying the business opportunity potential of the priority actions for the cement and concrete sector followed a two-step approach. First, relevant opportunities were selected from the *Future of*

*Nature and Business* report and mapped to the priority actions identified in this report. Second, the market potential for the cement and concrete sector was estimated across each selected opportunity, using relevant adjustment factors such as the global GDP share of the sector along its value chain for overarching sector opportunities (e.g. "wastewater reuse" opportunity).<sup>105</sup>

This sizing approach may not cover the entire set of business opportunities that present themselves for the sector. For example, the market potential of new technologies under development was not considered in the original 2020 report and is therefore not covered in this report. Similarly, the 2020 report did not aspire to exhaustively cover all present opportunities.

Further information on the methodology can be found in the Appendix.

FIGURE 10 Business opportunities for the cement and concrete sector, by 2030 (\$ billion)



Taking these five priority actions both in company operations and in the wider value chain will help companies in the sector to avoid or mitigate the four drivers of biodiversity loss across the four nature realms. These actions will also contribute

to the targets of the Kunming-Montreal Global Biodiversity Framework, which aims to halt and reverse biodiversity loss to achieve the global goal of nature positive (see Figure 11).

For each action, companies should also determine the baseline, set measurable and time-bound targets and report against progress regularly to

increase their accountability (see [Chapter 5: Get started](#) for more details).

FIGURE 11 Mapping of five priority actions to GBF framework

|  | Selected targets from the Kunming-Montreal Global Biodiversity Framework (non-exhaustive) |   |   |                       |                                       |   |   |  |
|--|---|---|---|-----------------------|---------------------------------------|---|---|--|
|  | #2: Restore degraded ecosystems   | #3: Protect/ conserve lands, inland water & ocean | #6: Eliminate and mitigate the impact of invasive alien species | #7: Reduce pollution  | #8: Minimize impact of climate change | #12: Increase access to green and blue spaces | #15: Sustainable business, production and supply chains | #16: Eliminate unsustainable consumption |
| <b>1</b> Improve water stewardship across the value chain  | Direct contribution   | Direct contribution                               |   | Indirect contribution |                                       | Indirect contribution                         | Indirect contribution                                   |  |
| <b>2</b> Adopt technologies and manufacturing practices to reduce greenhouse gas emissions and other airborne emissions              |   |   |   | Direct contribution   | Direct contribution                   |   |   |  |
| <b>3</b> Continue and strengthen reclamation and rehabilitation approaches, biodiversity management of quarries and land stewardship | Direct contribution   | Direct contribution                               | Indirect contribution   |                       |                                       |   |   |  |
| <b>4</b> Expand circularity efforts across the value chain   |   | Indirect contribution                             |   | Direct contribution   | Direct contribution                   |   | Direct contribution                                     | Direct contribution                      |
| <b>5</b> Accelerate innovation to offer products that support the nature-positive transition   |   |   |   | Direct contribution   | Direct contribution                   | Direct contribution                           |   | Indirect contribution                    |

Priority Action **1**

## Improve water stewardship across the value chain

Continuing to improve water stewardship across the value chain is a key sustainability pillar for the sector, to reduce both its dependence on water and its impact on water availability and quality. Sustainable water management is particularly important in regions facing water risk. As per current practice in the sector, solutions include conducting comprehensive water audits, framing water strategies and plans, improving the water efficiency of production processes and managing supplies in a sustainable manner. A number of technologies and methods are readily available and are already in use by businesses, such as:

- Establishing closed-loop recycling systems at production sites
- Adopting less water-intensive processes (e.g. for dust suppression)
- Creating artificial wetlands to reduce water withdrawal and support water quality (e.g. wetland cells for wastewater treatment)
- Replacing freshwater with non-freshwater sources by harvesting of rainwater or treating municipal wastewater



“ 75% of global concrete production is expected to occur in regions likely to experience water stress by 2050.

- Partnering with other local economic actors to share water resources (e.g. using discharges from other businesses operating in the vicinity of cement and concrete plants)<sup>106</sup>

Systematic freshwater management enables long-term operations in regions experiencing water stress, protecting the business model of companies in the sector. This is of particular importance given that 75% of global concrete production is expected to occur in regions likely to experience water stress by 2050.<sup>107</sup> Companies are already grappling with this challenge. Holcim, for example, reports that about 24% of the firm’s sites are located in medium to high

water-risk areas.<sup>108</sup> Heidelberg Materials estimates that around 38% of its plants are located in regions where water scarcity is projected by 2030.<sup>109</sup>

To proactively address the challenges of water scarcity, companies will need to further accelerate action. The GCCA provides guidance on how companies can monitor their water withdrawal<sup>110</sup> and is developing a water positivity tool able to calculate a water credit-to-debit ratio. Companies are also encouraged to make freshwater replenishment commitments. For example, Holcim has committed that by 2030, 75% of its sites located in water-risk areas will be water positive.<sup>111</sup>

Priority Action **2**

## Reduce greenhouse gas emissions and other airborne emissions

Building on progress made to date, further decarbonization of cement and concrete manufacture will be critical for achieving the nature-positive transition of this hard-to-abate sector. Companies have set themselves ambitious targets and roadmaps for reducing greenhouse gas and other harmful emissions. In 2021, the GCCA released the *2050 Cement and Concrete Industry Roadmap for Net Zero Concrete*, which signals “a significant acceleration of decarbonisation measures”, following a commitment in 2020 by GCCA members to produce carbon-neutral concrete by 2050 in line with global climate targets.<sup>112</sup> Similarly, the International Energy Agency (IEA) has offered extensive technical guidance for companies.<sup>113</sup>

Given that greenhouse gas emissions result both from the use of fossil fuel energy for combustion and from the chemical processes occurring when producing ordinary clinker, the sector’s net-zero pathways need to include a comprehensive set of actions. Solutions that businesses are researching and have already rolled out include:

- Innovating cement and concrete mixes to reduce the share of carbon-intensive ordinary clinker (see also priority action #5 related to innovation)
- Increasing the use of renewable energy for production combustion processes, such as burning sustainable alternative fuels in kilns or electrification of kilns using renewable power, such as concentrated solar power systems
- Optimizing existing production processes by, for example, introducing thermal efficiency measures with waste heat recovery

- Investing in carbon capture solutions, including both carbon capture and storage (CCS) and carbon capture and utilization (CCU)

It is vital that companies now follow through on their commitments to invest in and implement effective solutions. The World Economic Forum’s First Movers Coalition, which brings together the world’s major corporations and governments to decarbonize the seven hardest-to-abate sectors, has set a target for its members in the cement and concrete sector to ensure that at least 10% of their annual cement/concrete procurement volume is near-zero emissions by 2030.<sup>114</sup> The GCCA together with the Forum-supported Leadership Group for Industry Transition (LeadIT) has launched a green cement technology tracker, which provides an overview of global decarbonization efforts in the sector.<sup>115</sup>

Meanwhile, governments have to put in place the necessary enabling policy regime and supporting infrastructure, for example, rolling out carbon pricing mechanisms, updating standards and public procurement policies to expand the adoption and use of low-carbon cements, and supporting R&D and innovation through public funding. Some governments are already stepping up support. For example, in the US, the Inflation Reduction Act includes the Advanced Industrial Facilities Deployment Program, which will provide close to \$6 billion in funding for the development of energy-efficient innovations that lower greenhouse gas emissions in carbon-intensive industrial sectors.<sup>116</sup> The European Union’s Innovation Fund will disperse €40 billion by 2023 to support innovative low-carbon technologies.

“ The First Movers Coalition has set members a target that at least 10% of their annual cement/concrete procurement volume is near-zero emissions by 2030.



In 2020, members of the Global Cement and Concrete Association committed to produce carbon-neutral concrete by 2050, in line with global climate targets.

Global Cement and Concrete Association

## CASE STUDY 1

### VTT electrically heated rotary kiln

Concrete mixes have typically relied on Portland cement as an ingredient, which is made of clinker that requires temperatures of 1,500°C to produce. However, less energy-intensive substitutes are becoming available. For example, limestone calcined clay can be produced at 800°C, making electrifying kilns more feasible.<sup>117</sup>

Industry is working on pilots to electrify kilns. For example, the VTT Technical Research Centre of Finland, in cooperation

with corporate partners, has developed a fully electrically heated rotary kiln, which makes cement production close to carbon neutral when powered with low-emissions electricity and also incorporates carbon capture technology.<sup>118</sup> The American Council for an Energy-Efficient Economy estimates that kiln electrification could result in a 40-50% reduction of the emissions from cement production, when combined with a continuous clean power supply.<sup>119</sup>

## CASE STUDY 2

### Carbon capture

According to the European Cement Association, carbon capture, utilization and storage (CCUS) will account for 42% of CO<sub>2</sub> emission reductions in the cement and concrete sector in Europe by 2050.<sup>120</sup> The EU-funded CLEANKER project is working on a carbon capture and storage solution for cement production through a technology called calcium

looping. This technology promises a CO<sub>2</sub> capture efficiency of over 90% and can be retrofitted to existing kilns, making roll out much easier. CLEANKER is currently establishing a demonstration project at a cement plant in Vernasca, Italy, operated by Buzzi Unicem.<sup>121</sup>

Priority  
Action

3

## Continue and strengthen reclamation, rehabilitation and biodiversity management

Many cement and concrete companies, particularly those operating under more stringent regulatory frameworks such as in the EU, are already implementing quarry rehabilitation and biodiversity management plans. It is important now for all companies in the sector to take effective measures for both operational and inactive quarries.

Biodiversity management approaches and rehabilitation programmes enable cement and concrete companies to contribute to nature positive by helping to restore degraded habitats, recover species and measure a positive impact on biodiversity at new quarry and plant sites.<sup>122</sup> Management of temporary habitats is also important to efforts to support biodiversity during the quarry's operational phase and to help maintain species populations so that they can have a more rapid recovery come restoration.<sup>123</sup>

Various standards and guidelines exist to support companies with raising the ambition to restore and regenerate nature and biodiversity, for example:

- IUCN's Biodiversity Indicator and Reporting System (BIRS) guidelines<sup>124</sup>
- WBCSD Methodology for the Net Impact Assessment of Biodiversity in the Cement Sector<sup>125</sup>
- GCCA Sustainability Guidelines for Quarry Rehabilitation and Biodiversity Management<sup>126</sup>
- Birdlife International et al., Extractive Sector Species Protection Code of Conduct<sup>127</sup>
- Organizations such as Nature-based Insetting can provide further guidance and information regarding restoration and rehabilitation<sup>128</sup>

Leading businesses have already launched initiatives. For example, Holcim has introduced a nature policy that includes a quarry rehabilitation and biodiversity directive plus a mandate that all its quarries must have rehabilitation plans.<sup>129</sup> An old quarry in Switzerland, renatured by the company,

is now listed in the country's inventory of meadows and dry pastures of national importance.<sup>130</sup> Cemex – a founding company of the Cement Sustainability Initiative<sup>131</sup> – has been undertaking conservation and restoration efforts, with its programmes across 10 locations worldwide earning the Wildlife Habitat Council's (WHC) Conservation Certification.<sup>132</sup> In

2020, Cemex sold one of its longstanding UK nature reserves to the Nottinghamshire Wildlife Trust, highlighting the opportunity both for nature and biodiversity as well as for cement manufacturers as land owners.<sup>133</sup> Meanwhile, Heidelberg Materials has committed to 15% space for nature in all active quarries to align with nature positive.<sup>134</sup>

### CASE STUDY 3

## Hanson-RSPB Wetland Project<sup>135</sup>

The Hanson-RSPB Wetland Project is a collaboration between industry (Hanson UK, part of Heidelberg Cement Group) and conservation (RSPB, a member of Birdlife International). Launched in 2001, it aims to restore the fenland landscape, historically dominant in the UK's East Anglia region. Upon completion in 2030, RSPB Ouse Fen will become a vast wetland habitat equivalent to 980 football pitches. Over 28 million tonnes of sand and gravel will be excavated during the 30-year project, with sections progressively restored by Hanson before being handed over to the RSPB, making it the largest planned nature conservation restoration project following sand and gravel extraction in Europe.

Among its achievements, the area has welcomed key species, such as 12 booming bittern males and the rare European crane. The project emphasizes commercial-conservation collaboration, not only rejuvenating habitats but also offering recreational spaces and bolstering the local economy. Supported by Cambridgeshire County Council, this project demonstrates a symbiotic relationship between industry and conservation, showcasing the potential for large-scale environmental restoration.

🗣️ **Cement firms are encouraged to conduct biodiversity management on all land occupied, including production sites, office sites, as well as idle property land.**

In addition, firms are encouraged to conduct biodiversity management on all land occupied, including production sites, office sites, as well as idle property land. Involving employees and communities in these efforts is important. For example, Wienerberger has committed to implementing a biodiversity action plan at its production sites.<sup>136</sup> Meanwhile, Rudus launched its LUMO biodiversity programme in 2012, implementing biodiversity measures in operating sites for aggregate extraction as well as around factory buildings.<sup>137</sup> Companies can also support external conservation efforts. For example, CEMEX has been supporting the preservation of natural areas at the El Carmen Nature Reserve in North America.<sup>138</sup>

Another way to signal leadership is to collaborate with nature conservation organizations to develop biodiversity management standards and guidance to influence the whole industry. For example, Heidelberg Materials has partnered with BirdLife International since 2011 and co-developed the Extractive Sector Species Protection Code of Conduct referenced above.<sup>139</sup> Meanwhile, Holcim has partnered with Fauna & Flora International (FFI) to develop criteria to define "biodiversity importance categories" to support companies in prioritizing biodiversity management approaches according to the value of biodiversity at sites.<sup>140</sup>





## Expand circularity across the value chain

The increased application of circular business models can greatly reduce the sector's impacts on nature, especially greenhouse gas emissions, water consumption and the use of finite resources. At the same time, circular approaches present a considerable opportunity for companies to reduce operational costs and open up new revenue streams, due to lowering demand for energy and feedstocks, avoiding carbon taxes and landfill costs, and opening access to new markets such as waste management and recycling.

Cement and concrete companies are already contributing to waste management through co-processing – the practice of substituting conventional fossil fuels with alternatives ones, such as processed waste or refuse-derived fuel (e.g. from tyres, sewage sludge, agricultural waste). Co-processing is a practical way to recover energy from waste while reducing fossil fuel reliance. However, careful measures are needed to control the release of dioxins, heavy metals and toxic gases such as carbon monoxide.<sup>141</sup>

Leading cement and concrete players are already pursuing circular models. For example, Cemex has set the goal of increasing the amount of waste and by-products captured for use as alternative fuels and raw materials by 50% by 2030, with 95% of waste being reused, recycled or recovered.<sup>142</sup> On average, Holcim already includes 20% recycled

content in its cement,<sup>143</sup> and has launched two cement and concrete product ranges which scale up the recycling of construction and demolition waste (CDW).<sup>144</sup>

Innovation is on the rise across the industry. The GCCA is working with major cement and concrete producers in India, Thailand, Egypt and Colombia in accelerator programmes, including the roll out of circular economy practices.<sup>145</sup> Holcim has built a six-month accelerator programme to support start-ups and initiate an open innovation platform to identify new technologies. Similarly, Heidelberg Materials received the German Innovation Award for Climate and Environment for its ReConcrete-360° concept, which uses demolished concrete to create hardened cement paste that can be reused as a low-carbon alternative to natural limestone in clinker and cement production.<sup>146</sup>

Introducing circular approaches will enable companies to future-proof their business models by providing access to compelling opportunities in the new nature-positive economy. For example, in the United Kingdom alone, 72 million tonnes of waste come from the construction industry. It is estimated that up to 95% of this waste is recyclable, with most being clean and unmixed.<sup>147</sup> For a range of circular solutions for cement and concrete production, see Box 4.<sup>148</sup>

“Circular approaches present a considerable opportunity for companies to reduce operational costs and open up new revenue streams.

“China's Circular Economy plan includes a target of 60% reutilization for construction waste by 2025.

### BOX 4

#### Circular solutions for cement and concrete production

##### Recirculation of materials:

- Using waste from other industries as feedstocks for cement and concrete manufacturing (e.g. metal slags or fly ash to replace clinker)
- Recycling construction and demolition waste (CDW), including reusing entire structures or recirculating CDW as gravel for road construction, aggregates for concrete, or as a replacement for clinker

##### Recirculation of carbon dioxide:

- Curing of ready-mix precast concrete
- Enhanced recarbonation of CDW
- Mineralization of aggregates from waste
- Use of carbon for other industries, such as the chemicals sector

In some countries, policies have been put in place to increase construction and demolition waste recycling, and concrete containing recycled aggregate is being marketed and used. For example, Zurich, the largest city in Switzerland, has a requirement that all publicly owned buildings have to be made using recycled concrete.<sup>149</sup> The EU's Circular Economy Action Plan focuses on construction and buildings as one of eight priority sectors,<sup>150</sup> and China's Circular Economy plan includes a target of 60% reuse for construction

waste by 2025.<sup>151</sup> Standard setters have developed guidelines and standards, for example, GCCA's guidelines for co-processing fuels and raw materials in cement manufacturing, raising the standards for raw material use.<sup>152</sup>

Meanwhile, great care has to be taken when setting requirements for recycled construction and demolition waste in cement and concrete. Use of waste could lead to higher demand for cement, increasing the carbon footprint of the product. It

can also result in waste being hauled very long distances to meet demand, leading to adverse environmental impacts. A careful life-cycle analysis of impact is therefore needed to avoid unintended consequences.

Circular technologies and solutions, now being actively adopted by many companies in the sector, hold the promise of revolutionizing the industry. This shift is anything but easy. It requires new collaborations with external players

and navigation through the evolving regulatory landscape. Significant investment in innovation and acquisitions underpins the sector's efforts to adapt to circular business models. There is optimism that with continuous multistakeholder collaboration, a more supportive and enabling regulatory framework, good initial planning and design of buildings, thoughtful renovations and demolitions, and careful implementation in using CDW, the sector can fully realize the potential of circularity in the built environment.

Priority Action **5**

## Accelerate innovation to support the nature-positive transition

Innovating the product portfolio presents a key pillar for cement and concrete companies to advance their nature-positive journey. Similar to the adoption of circular approaches, these changes will be transformative, requiring companies to rethink their business models and undertake substantial investment. While corporate leaders

must account for the risks associated with this shift, product innovation offers new opportunities in the nature-positive economy and will enable cement and concrete manufacturers to future-proof their businesses. For a range of possible product innovations in cement and concrete production, see Box 5.

BOX 5

### Possible product innovations in cement and concrete production

- Develop and roll out new concrete mixtures that substitute Portland cement with more sustainable materials, using cement additives such as slags, fly ash and pozzolans
- Introduce new cement blends that are more sustainable than Portland cement
- Replace clinker with less carbon-intensive materials such as limestone calcined clay
- Reduce the total amount of clinker or substitutes needed (e.g. by using low-binder cements)
- Develop new construction and design approaches and solutions that reduce the amount of concrete required for construction
- Introduce new service offerings, especially downstream, such as waste management solutions to process and recycle waste

“ Product innovation offers new opportunities in the nature-positive economy and will enable cement and concrete manufacturers to future-proof their businesses.

Companies are already investing in technologies and opportunities that are kickstarting the shift in the sector's business models. For example, Holcim has invested in 3D construction printing technology to empower smart design which can reduce material use by up to 50%. It is also investing in other smart design technologies, including carbon-fibre prestressed concrete (CPC) prefabricated panels.<sup>153</sup> Similarly, Heidelberg Materials has invested in Giatec Scientific, which is developing a sensor technology and artificial intelligence (AI)-driven software to optimize processes for concrete customers. Giatec has developed multiple sensors that ultimately reduce material demand and improve the sustainability of construction activities.<sup>154</sup> Heidelberg Materials in collaboration with Metsä Wood, a Finnish producer of engineered wood products, is also developing a hybrid element to combine concrete and wood for future building structures.<sup>155</sup>

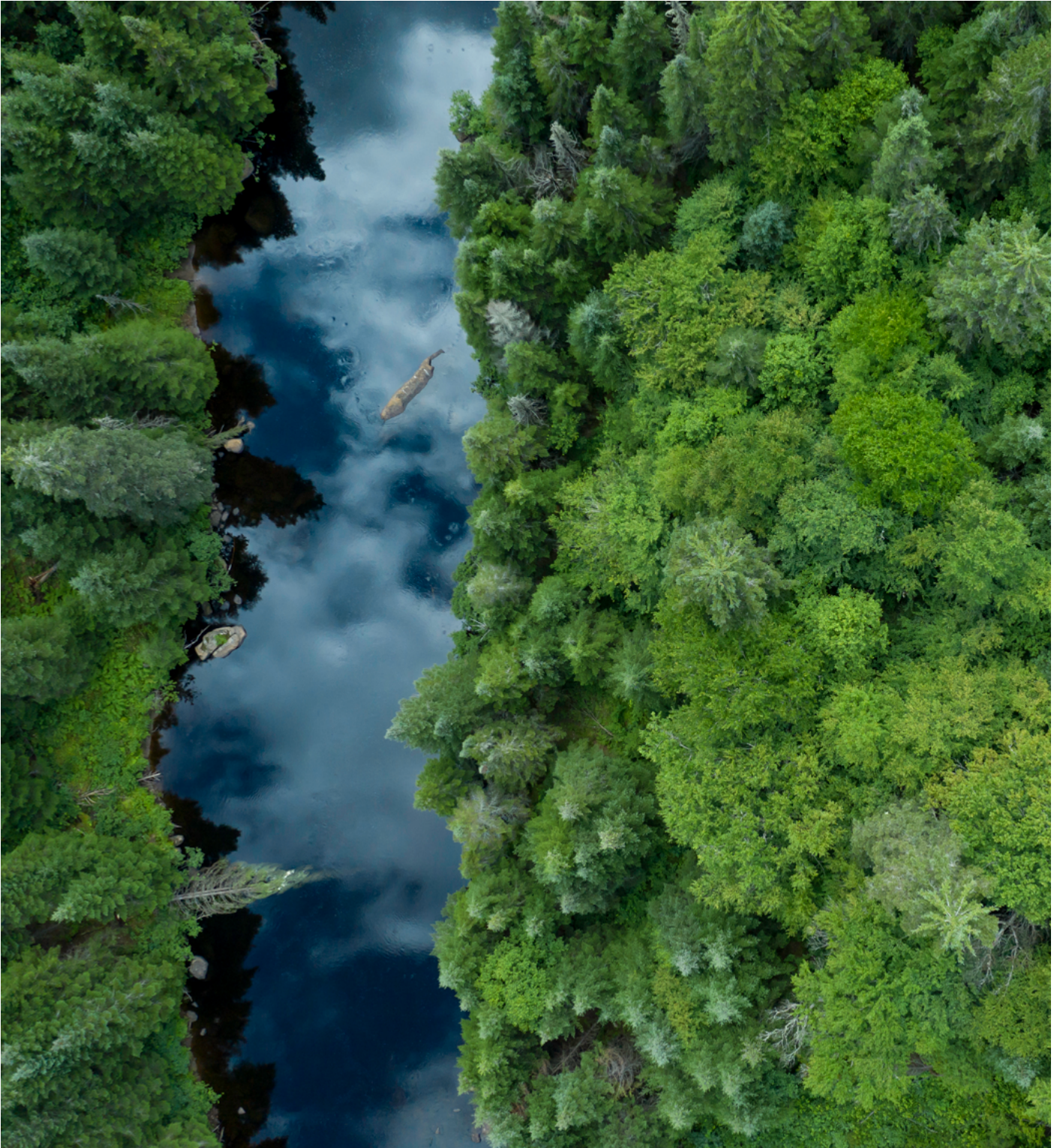
Partnerships with green building councils, construction engineering companies, architects and other stakeholders to improve holistic design and encourage the use of nature-enhancing products are crucial. New products can support nature-based solutions, such as using concrete in coral reef restoration, with careful analysis of the benefits and impacts. One recent innovation developed at Thailand's Chulalongkorn University involves the 3D printing of concrete coral reef modules. The product, Innovareef, is designed to enhance coral larval settlement and metamorphosis to restore marine and coastal resources.<sup>156</sup> Another innovation is Holcim's bio-active concrete solutions that have been used to build artificial reefs on the French Mediterranean coast. Holcim has also introduced a type of permeable concrete which can be installed on top of soil to enable access to nutrients and water for trees in urban environments, improve water capture and mitigate flooding risks.<sup>157</sup>



5

# Get started

The twin imperatives of addressing climate change and nature loss are highly interdependent. Companies should complement their net-zero plans by setting credible nature strategy.





While many companies in the cement and concrete sector have already embarked on the nature journey and embraced the five priority actions, achieving transformative business model changes and making genuine contributions towards a nature-positive world by 2030 demands significant time and resource investments from companies.

The journey to deliver net-zero emissions and tackle nature loss are two business concerns that are highly interdependent: climate change is a main driver of biodiversity loss and efforts to tackle climate change cannot succeed without safeguarding nature. Therefore, the nature-positive transition is synergistic to companies' net-zero commitments and should be integrated into their climate transition plans.

Guidance is emerging on both transition planning for net zero and ways to adapt those plans to integrate nature and biodiversity. Several institutions are working on such guidance, for example:

- **UK Transition Plan Taskforce (TPT)** created a new working group focused on nature in early 2023.<sup>158</sup>
- **Glasgow Financial Alliance for Net Zero (GFANZ)** has published a best practice framework for net-zero transition planning.<sup>159</sup> The framework has five themes or components: 1) Foundations, 2) Implementation strategy, 3) Engagement strategy, 4) Metrics and targets and 5) Governance.
- **WWF** has produced a step-by-step framework<sup>160</sup> to support the integration of nature into climate-related transition planning, building on the GFANZ framework. This framework starts by ensuring that climate-tackling actions do not come at the detriment of nature, emphasizes the importance of enhancing the co-benefits of natural climate solutions and seeks to align net-zero transition plans with nature-positive goals.



## 5.1 | Align strategy with organizational maturity

An assessment of a company's organizational readiness and maturity can help it identify the most suitable guidance and tools to drive action and understand its performance on the nature-positive journey. Table 2 details recommended actions to

deliver a nature-positive strategy mapped to an organization's level of readiness and maturity. These actions are broadly organized in line with GFANZ's five themes or components of net-zero transition planning mentioned above.

TABLE 2 | Mapping the components of a nature-positive strategy against organizational maturity

| Organizational maturity<br>Component of a nature-positive strategy | Starting and developing   | Advanced and leading  |
|--|---|---|
| <b>Summary</b>   | Identify nature-related issues<br>Set a high-level ambition and/or targets for nature<br>Present stand-alone actions on nature  | Integrate nature into strategy and governance<br>Assess impacts and dependencies for all potentially relevant realms<br>Set measurable and science-based targets for nature<br>Implement strategic action, redefine industry business models and mobilize the whole value chain   |
| <b>Foundations</b>   | Employ sectoral averages for high-level screening to discern priority effects on nature<br>Use secondary data for materiality assessments to gauge priority impacts and nature dependencies, considering factors like environmental pollution<br>Use tools and guidance such as <a href="#">ENCORE</a> , SBTN's <a href="#">initial guidance for business</a> and <a href="#">materiality screening tool</a> , <a href="#">Aqueduct</a> from WRI, TNFD's upcoming Getting started guidance, WWF's <a href="#">biodiversity risk filter</a> and <a href="#">water risk filter</a> , UNEP-FI's <a href="#">report on high-risk sectors</a> and the <a href="#">Integrated Biodiversity Assessment Tool (IBAT)</a> | Refine materiality assessment by measuring impacts and dependencies on nature using primary operations data and environmental indicators, and undertake an in-depth analysis of significant risks and opportunities, understanding their influence on financial statements<br>Maintain a comprehensive grasp of organizational resilience with an actionable plan for managing nature risks and opportunities<br>Perform thorough valuations of all priority areas, considering trade-offs, using value chain data and recognizing the mutual benefits for business and society<br>Use tools and guidance such as <a href="#">ENCORE</a> , SBTN's <a href="#">Step 1 – Assess</a> , <a href="#">Step 2 – Prioritize</a> and TNFD's <a href="#">LEAP approach</a> , <a href="#">Aqueduct</a> from WRI, WWF's <a href="#">biodiversity risk filter</a> and <a href="#">water risk filter</a> , UNEP-FI's <a href="#">report on high-risk sectors</a> and the <a href="#">Integrated Biodiversity Assessment Tool (IBAT)</a> |
| <b>Implementation strategy and engagement strategy</b>             | Develop sustainable procurement policies with suppliers that have nature-focused elements<br>Prioritize actions to avoid and reduce negative impacts in the company's direct operations and upstream supply chain<br>Implement initial traceability for primary suppliers<br>Be aware of National Biodiversity Strategies and Action Plans (NBSAPs) and recognize the interdependence of nature and climate in advocacy efforts   | Adopt a circular strategy and embrace regenerative principles by linking capital to nature-positive outcomes and by involving all stakeholders, including employees, clients and customers<br>Establish advanced traceability for key materials and ensure supplier alignment; expand traceability throughout product life cycle; foster innovative supplier collaborations<br>Engage actively in NBSAPs, champion nature-positive outcomes and advocate for integrated reforms benefiting nature, climate and society  |
| <b>Metrics and targets</b>   | Set nature-positive goals on a timeline using the SMART approach<br>Validate commitments using third-party stakeholders   | Detail and report on targets for nature-related risks and opportunities based on TNFD's <a href="#">management and disclosure framework</a><br>Prepare for science-based targets on land and freshwater by using SBTN's <a href="#">Step 3: Measuring Baselines &amp; Target Setting</a>  |
| <b>Governance</b>  | Assign a management member for nature-based risks, ideally overseeing both climate and nature<br>Incorporate nature into environmental risk management, especially within enterprise risk management (ERM), environmental, social and governance (ESG) and sustainability teams<br>Train governance roles on the connection between nature and wider ESG risks  | Ensure board or senior management ownership of nature actions<br>Tie performance on nature and climate to leadership incentives<br>Set up governance structures for managing, reporting and overseeing nature-based risks and actions on nature across the organization, including informing relevant board-level committees  |

## 5.2 A deeper look at metrics to support decision-making

Companies need to track and publicly report on their actions against relevant metrics to strengthen their credibility and ensure they deliver an effective transition. This section takes a deeper look at the metrics and indicators available.

### TNFD's LEAP approach

A good place to start is with the *Additional draft guidance for corporates on science-based targets for nature*, published jointly by TNFD and SBTN.<sup>161</sup> TNFD differentiates between assessment metrics and disclosure metrics along the four phases of the LEAP approach (see Figure 12).<sup>162</sup>

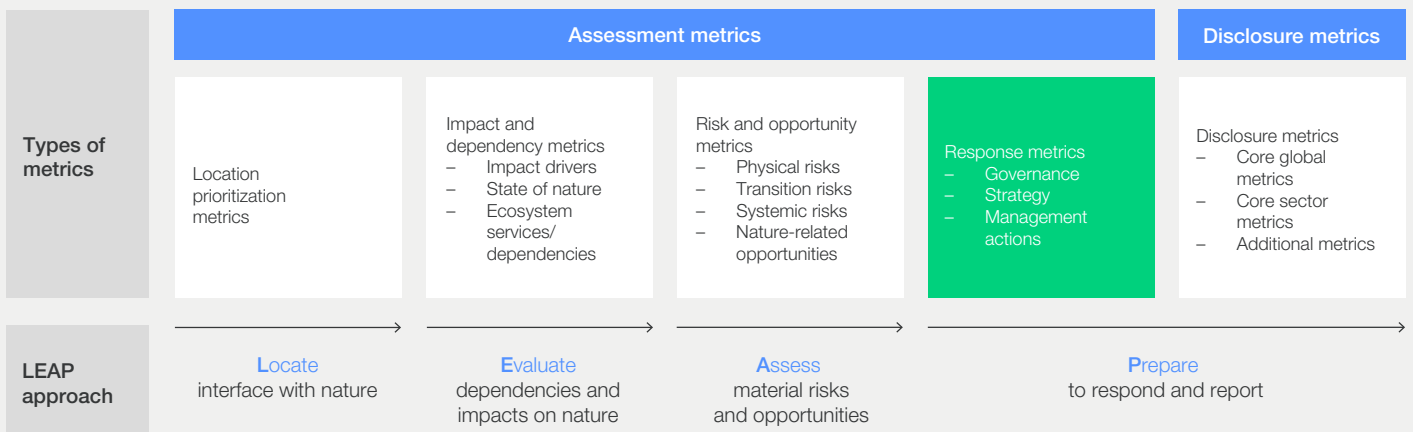
- Locate interface with nature
- Evaluate dependencies and impacts
- Assess material risks and opportunities
- Prepare to respond and report

TNFD's definition of assessment metrics includes "response metrics", which are what this chapter focuses on. These cover the internal reporting on an organization's actions, policies, commitments, plans and targets to manage nature-related dependencies, impacts, risks and opportunities – in both direct operations and the value chain.<sup>163</sup>

### Differentiating between input and output indicators

There are a number of dimensions to indicators and metrics. They should be both qualitative and quantitative. They should also measure inputs and processes and – importantly – outputs and outcomes as well (see Table 3).

FIGURE 12 Types of metrics in TNFD's LEAP approach



Source: Adapted from TNFD's approach to metrics.<sup>164</sup>





TABLE 3 | Input and output indicators and examples

| Indicator type                              | Example  |
|---|--|
| <p><b>Input and process indicators</b></p>  | <p>Resources and activities that are deployed by a business in service of a certain priority action, e.g.:</p> <ul style="list-style-type: none"> <li>– Investment in water management systems</li> <li>– Numbers of staff in the nature or sustainability team</li> </ul>   |
| <p><b>Output and outcome indicators</b></p> | <p>Tangible results stemming from undertaking a priority action, e.g.:</p> <ul style="list-style-type: none"> <li>– Commitment to no conversion of natural ecosystems</li> <li>– % reusable, recyclable or compostable plastic packaging</li> <li>– % of raw material certified by commodity-specific certifications in the supply chain (that are identified as critical suppliers based on materiality assessment and volume)</li> </ul> |

Companies should define a set of indicators and metrics according to the mitigation hierarchy (Avoid & Reduce, Restore & Regenerate, Transform) to assess their activities and the impacts achieved.<sup>165</sup> Table 4 lists a number of sample indicators and metrics, aligned with the mitigation hierarchy, that can help business leaders as they start to develop their approaches for monitoring and measuring priority actions.

These sample indicators and metrics are a non-exhaustive set of indicative ideas. They can be applied at organization, product, service line and location levels. For more details, refer to TNFD’s guidance on response metrics.<sup>166</sup> In addition, the GCCA has developed guidance that can inform companies as they develop indicators and metrics.<sup>167</sup>



TABLE 4 | Sample indicators and metrics aligned with the mitigation hierarchy

| Mitigation hierarchy            | Priority action   | Indicative sample indicator/metric (non-exhaustive)   |
|---------------------------------|---|---|
| <b>Avoid &amp; Reduce</b>       | Freshwater management   | % of sites certified by ISO 14001*  |
|                                 |   | Total volume of water consumption, withdrawal and discharge***  |
|                                 |   | Total volume of water consumption per unit of product***  |
|                                 | Reduce GHG emissions  | % value chain emission reductions in line with 1.5°C  |
|                                 | Reduce other emissions  | % of clinker produced by kilns covered by continuous and discontinuous measurements of emissions and covered by only continuous measurement***<br>Absolute emissions of pollutants***                             |
| <b>Restore &amp; Regenerate</b> | Upgrade reclamation and rehabilitation approaches and biodiversity management of quarries | % of quarries with high biodiversity value where biodiversity management is implemented***  |
|                                 |   | % of quarries where rehabilitation plan is implemented***   |
|                                 | Restoration   | Performance against commitment for biodiversity net gain<br>% of affected stakeholders meaningfully engaged in area*<br>Investment and extent of restoration of negatively impacted ecosystems*                   |
| <b>Transform</b>                | Circularity   | Circular material use rate*   |
|                                 |   | Number of knowledge products/research projects on circularity*  |
|                                 | Business model change   | Extent to which customers/suppliers are engaged on circular economy topics*<br>Investment in nature-related product/service lines/technology*<br>Number of sector-wide or multistakeholder initiatives supported* |

\* Aligned with TNFD v0.4 examples of response metrics

\*\* Aligned with SBTN Interim targets

\*\*\* Aligned with GCCA sustainability guidelines

## 5.3 | Map the transition onto business functions

Mapping the nature-positive transition onto distinct business functions requires a holistic approach to ensure that every division synchronizes its strategies with nature-positive aspirations.

TABLE 5 | **Mapping strategies and actions by business function**<sup>168</sup>

| Business function                  | Potential strategies and actions required for a nature-positive transition   |
|------------------------------------|--|
| <b>Sustainability</b>              | <p>Develop the nature-positive strategy for the business (together with the strategy function)</p> <p>Obtain a holistic understanding of impacts and dependencies of the firm's operations and products</p> <p>Collaborate with other functions to drive the wider transition of the business</p> <p>Drive nature conservation and restoration initiatives</p> <p>Promote collective sector-wide positive action, such as sustainable raw material sourcing or collaboration on bio-based or recyclable material research</p> <p>Monitor sustainable sourcing practices and raw material certification</p> <p>Support and enable collaborations with NGOs as well as industry initiatives</p>  |
| <b>Finance and risk management</b> | <p><b>Financial management</b></p> <p>Revise capital planning assumptions for nature-positive related business cases (e.g. pay-off periods for investments may increase versus traditional capital expenditures)</p> <p>Consider impacts of nature-positive transition on balance sheet (e.g. high-polluting assets might have to be written off prematurely or written down on an accelerated timeline)</p> <p><b>Investments</b></p> <p>Increase capital spending on projects enabling the nature-positive transition of the business (e.g. retrofitting plants, supporting other nature-based solutions)</p> <ul style="list-style-type: none"> <li>– In particular, allocate funding to improve water stewardship measures, including water audits, wastewater recycling and water basin restoration</li> </ul> <p>Allocate budget for innovation spending, such as for circular innovations and research into bio-based or recycled material for feedstocks</p> <ul style="list-style-type: none"> <li>– Plan for the financial implications of incorporating circularity and sustainable product development</li> </ul> <p>Commit to investments in nature conservation, restoration and nature-based solutions in collaboration with NGOs and local communities</p> <p><b>Financing</b></p> <p>Consider that the cost of capital for high-polluting operations could increase</p> <p>Consider that availability of capital may become contingent on credible nature-positive strategies</p> <p>Leverage new sources of funding, such as green bonds and sustainability loans, nature-focused impact funds, blended financing and partnership with NGOs</p> <p><b>Risk management and disclosure</b></p> <p>Consider that new nature-related risks may emerge that need to be managed (see TNFD framework), for example:</p> <ul style="list-style-type: none"> <li>– Physical and supply chain risks, such as decreased water availability or quality in the supply chain</li> <li>– Transition risks including demand shifts, regulatory risks and reputational risks</li> </ul> <p>Prepare required nature-related disclosures for audited statements for CSRD (and potentially under forthcoming requirements of the IFRS Foundation's ISSB)</p> |



| Business function | Potential strategies and actions required for a nature-positive transition |
|-------------------|--|
|-------------------|--|

**Strategy and corporate development**

Develop the nature-positive transition plan for the company (together with the sustainability function)

Conduct horizon scanning and comprehensive market research for new opportunities related to the nature-positive transition (e.g. markets, products, processes, technologies)

Evaluate the risks and returns associated with more disruptive opportunities (e.g. circularity approaches, new products) and identify business cases in the new nature-positive economy

Re-evaluate products that have a high environmental impact (e.g. certain manufacturing processes or certain products that cause major impacts on land, water, ocean and atmosphere in their use and end-of-life phases)

Drive necessary organizational changes to align business operations with the requirements of the new nature-positive economy (e.g. develop departments or teams focused on nature-positive initiatives; establish cross-functional teams to address sustainability challenges within the firm and across its supply chain)

**Research and development (R&D)**

Invest in research for new nature-positive products and production techniques

Introduce new metrics to track the effect of R&D spending related to the nature-positive transition of the business, in addition to financial returns from R&D spending

**Operations (own)**

Identify relevant indicators and establish applicable metrics as well as define the respective target ambition and baseline for each and subsequently report publicly on progress made

Adopt solutions to reduce the nature impact of the business, including:

- Leverage technology and develop partnerships for better energy efficiency and low-carbon manufacturing
- Improve water management by more efficient tracking of water consumption, enhancing wastewater recycling rates and working on basin restoration efforts
- Ensure all current and former quarries follow adequate biodiversity management plans, including rehabilitation plans and efforts for vegetation restoration and wildlife reintroduction

**Operations (supply chain management)**

Identify relevant indicators, establish applicable metrics, define the respective target ambition and baseline for each and subsequently report publicly on progress made

Collaborate with suppliers for sustainable sourcing and improved traceability

Support suppliers (where possible) in taking nature-positive actions for their own operations

**Human resources**

Upskill workforce on nature and biodiversity topics (where relevant)

Hire relevant external expertise (e.g. additional human resources might be required to prepare for upcoming nature-related reporting and disclosure requirements)

**Sales and marketing**

Promote products that have minimal impacts on nature and biodiversity and offer eco-friendly solutions

Provide disclosure on impacts and dependencies of products, especially as customers may expect more information on nature footprint, which requires transparent and traceable supply chains

Develop a holistic understanding of customer segments and willingness to pay for greener products

**Investor relations**

Disclose nature-positive initiatives and their impact on company performance (e.g. company commitments to water stewardship, sustainable sourcing and circular economy practices)

Highlight contributions to global frameworks like the Kunming-Montreal Global Biodiversity Framework

Manage investor engagement on nature topics

**Public affairs**

Advocate nature-positive action in the public space

Collaborate with policy-makers, regulators and other standard-setters to develop effective, progressive policies, regulations and standards supporting the transition of the sector

6

# Conclusion

As the world stands at a pivotal ecological juncture with the intertwined crisis of climate change and nature loss, the clarion call for the cement and concrete sector is unequivocal: Lead the change.

Nature is at a critical juncture, with current resource consumption surpassing Earth's sustainable threshold. Amid this crisis, cement and concrete continue to act as a foundation for societies and economies, essential for the construction of the built environment needed to accommodate ever-more citizens as global urbanization rates head towards 68% by 2050.

However, the sector's environmental impact demands an urgent shift towards a net-zero, nature-positive trajectory. International frameworks, such as the Kunming-Montreal Global Biodiversity Framework, champion this transition and regulatory instruments are setting mandatory environmental disclosures. The cement and concrete sector now faces both a challenge and an opportunity: to continue complying with emerging regulations while seizing proactive measures for resilient growth. Commendable strides, such as the Global Cement and Concrete Association's sustainability charter and guidelines, have been taken already. But the sector must press ahead faster with ongoing initiatives to mitigate its climate and environmental footprints, particularly in greenhouse gas emissions, water consumption and ecosystem impacts.

To lead the transition, cement and concrete companies should strengthen sustainable water management, reduce greenhouse gas emissions through innovative technologies, continue and improve quarry rehabilitation and biodiversity efforts, amplify circularity, and innovate products that bolster the nature-positive transition.

With pressing concerns such as water stress and biodiversity loss, there is an urgent need for more robust, transformative action. Now is the time for the sector to go beyond responding and complying – to champion a transformative, nature-positive trajectory.

# Appendix

## Definitions of nature positive

### BOX 6 Existing definitions of nature positive

| Guidance provider  | Guidance description   |
|--|--|
| Business for Nature  | <a href="#">How business and finance can contribute to a nature positive future now</a>                    |
| European Commission  | <a href="#">European Business &amp; Biodiversity Platform</a>  |
| Independent scientists                                     | <a href="#">A Nature-Positive World: The Global Goal for Nature</a>  |
| International Union for Conservation of Nature (IUCN)      | <a href="#">Towards an IUCN nature-positive approach: a working paper</a> (under consultation)             |
| Science Based Targets Network (SBTN)                       | <a href="#">SBTN Interim Targets</a><br><a href="#">"Nature-positive" – an opportunity to get it right</a> |
| World Business Council for Sustainable Development (WBCSD) | <a href="#">What does nature-positive mean for business?</a>   |

### Cement and concrete sector boundaries

This report focuses on cement and concrete production as a sub-sector of the “construction materials” industry. Construction materials are defined within SASB’s Sustainable Industry Classification System (SICS),<sup>169</sup> as follows: “Construction Materials entities have global operations and produce construction materials for sale to construction entities or wholesale distributors. These primarily include cement and aggregates, but also glass, plastic materials, insulation, bricks and roofing material. Materials producers operate their own quarries, mining crushed stone or sand and gravel. They may also purchase raw materials from the mining and petroleum industries.”

The definition of the construction materials industry was narrowed to allow for in-depth investigations into impacts and dependencies specific to the manufacturing processes and materials used. Cement and concrete were selected as the focus of the construction materials industry due to their essential role in construction, their impacts and dependencies, as well as the Forum’s expertise and relationships with this sector. The sector begins at the establishment of quarries, includes

all of the direct processing and manufacturing of materials, and continues until the final cement and concrete products are produced and distributed to downstream users.

Consistent with the approach taken by TNFD to define equivalent classifications to scope 1, scope 2 and scope 3 emissions in climate, this work has classified the value chain into three categories: direct operations, upstream and downstream. This classification is also consistent with SBTN’s methodology and is easily implementable by companies.

### Impact and dependency analysis

The assessment of impacts and dependencies is mainly based on ENCORE and the SBTN sectoral materiality tool (SMT) (only covers upstream and direct operation) – high and very high materiality.

Other sources include: CDP Water Watch, WWF Water and Biodiversity Risk Filters, extensive desk research, academic reviews, company-specific insights and assessments, analysis by Oliver Wyman and Oliver Wyman 3D Carbon Accounting, analysis by the World Economic Forum and industry expert interviews.



## Opportunity sizing

A detailed overview of the opportunity sizing conducted for the Forum's *Future of Nature and Business* report, published in 2020, can be found in its methodology note.<sup>170</sup>

In the absence of a reliable global data point, the global direct, indirect and induced GDP impact

of the cement and concrete sector has been estimated using the assumed sector share of the wider "construction industry" as defined by BMI (a Fitch Solutions Company).<sup>171</sup>

This report has identified the following opportunities from the *Future of Nature and Business* report as relevant.



FIGURE A1 | Nature-positive business opportunities for cement and concrete sector

| Priority action  | Business opportunity from <i>Future of Nature and Business report</i>  | Original size in <i>Future of Nature and Business report</i> (\$ billion) | Adjustment factor to size share of cement and concrete sector                               | Opportunity size for cement and concrete sector (\$ billion)                               |  |   |      |
|--|--|---|---|--|--|---|------|
| <b>1</b> Improve water stewardship across the value chain  |  Waste and sanitation infrastructure                | 155   | Global direct, indirect and induced GDP impact of cement and concrete sector: <b>1.06%</b>  | 0.64   |  |   |      |
|  |  Wastewater reuse                                   | 50  |   | 0.53   |  |   |      |
|  |  Natural systems for water supply                   | 140   |   | 1.48   |  |   |      |
|  |  Water efficiency in mining                         | 75  |   | 0.80   |  |   |      |
| <b>2</b> Adopt technologies and manufacturing practices to reduce greenhouse gas emissions and other airborne emissions              |  Technology in energy and extractives supply chains | 30  |   | Global direct, indirect and induced GDP impact of cement and concrete sector: <b>1.06%</b> | 0.32   |   |      |
|  |  Expansion of renewables                            | 650   |   |  | 6.89   |   |      |
| <b>3</b> Continue and strengthen reclamation and rehabilitation approaches, biodiversity management of quarries and land stewardship |  Natural climate solutions                        | 85  |   |  | Estimated market potential for cement and concrete sector: <b>20%</b> <sup>172</sup> | 0.90  |      |
|  |  Restoring degraded land                          | 75  |   |  |  | 0.80  |      |
|  |  Mine rehabilitation                              | 50  |   |  |  | 0.74  |      |
| <b>4</b> Expand circularity efforts across the value chain   |  Waste management                                 | 305   |   |  |  | Global direct, indirect, and induced GDP impact of cement and concrete sector: <b>1.06%</b> | 3.23 |
|  |  Additive manufacturing                           | 135   |   |  |  |   | 1.43 |
|  |  Circular models - construction                   | 70  |   |  |  |   | 14   |
|  |  Resource recovery                                | 225   | 2.39  |  |  |   |      |
| <b>5</b> Accelerate innovation to offer products that support the nature-positive transition   |  Energy efficiency - buildings                    | 825   | Global direct, indirect, and induced GDP impact of cement and concrete sector: <b>1.06%</b> |  |  |   | 8.75 |
|  |  Building resilience to climate shocks            | 20  |   |  |  |   | 0.21 |
|  |  Urban green roofs                                | 15  |   |  |  |   | 0.16 |
|  |  Shared infrastructure                            | 130   |   | 1.38   |  |   |      |

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Global Commons Alliance

Golden Bee

International Union for Conservation of Nature (IUCN)

Metabolic

Partnership for Biodiversity Accounting Financials (PBAF)

Planet Tracker

Science Based Targets Network (SBTN)

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(seconded from Accenture)

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## Production

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