The State of Corporate & Government Water Reporting in India

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EXECUTIVE SUMMARY

Is India on track for the water SDGs?

In the 1990s, India embarked on a series of economic and political reforms to facilitate a program of rapid industrialisation[1]. This restructuring of India's political economy placed it on a trajectory of rapid economic expansion and development.

However, recently, India's rise has been beset by growing pressure on its natural resources and social infrastructure, signalling an inflection point in its development path. This trend is no more acute than in India's water economy which faces a series of protracted threats from mounting demand and supply side pressures (see section 3).

Despite issues related to water attaining high status within India's policy agenda, India's fragmented approach to water management is failing to make inroads into alleviating immediate threats to water user groups within its economy[2,3,4]. This bears an immense economic and social cost. Over half of India's rivers are currently polluted[5], and a report by Water Aid estimates the health burden alone of poor water quality costs the Indian government $600 million a year[6].

One potential barrier to effective water management in India is the existence of information asymmetries on impacts occurring within India's water economy between different tiers of government and water user groups. Indeed, it is commonly recognised that where knowledge gaps exist between scales of governance, mismanagement of resources is likely to result at all scales[7,8,9].

This report examines the current state of corporate and government reporting of water sustainability in India in order to infer its readiness for enacting the water-related UN Sustainable Development Goals (SDGs) (Appendix A).

Upon investigation, we find acute misalignments and asymmetries within and between corporate and government frameworks used to monitor and report on several aspects of water sustainability. Accordingly, we conclude that existing mechanisms for water reporting in India are potentially ill-equipped for enacting and monitoring India's progress against the water-related SDGs (see section 4).

In response, we highlight several opportunities for reconciling blind spots within, and misalignments between government and corporate reporting scales to help refocus India's water governance on the upcoming SDGs.

Harmonising reporting?

In order to improve the alignment of the corporate and government frameworks used to monitor and report water sustainability in India with the water-related SDGs, we

recommend channelling efforts towards broader reporting of *Access*, *Compliance* and *Infrastructure* dimensions of water sustainability at both corporate and government scales (Figure 2).

Whilst *Access* to water and sanitation is moderately reported at the government level - largely within the India's Statistical Year Book[10] and Ministry of Environment, Forests and Climate Change[11] - we find no reporting criteria outlined within government guidelines for corporate disclosure on this issue (i.e. within the SEBI's Business Responsibility Reports[12] and National Voluntary Guidelines[13]). Compounding this, we observe no explicit reporting criteria within corporate water reporting frameworks analysed (GRI[14], CDP's Water Disclosure Framework[15] and the CEO Water Mandate[16]) encouraging businesses to evaluate the impact of their activities in relation to *Access* to water and sanitation.

This gradient of coverage, however, presents opportunities for both India's government and its business community to improve their understanding and management of *Access* to clean water and sanitation. For business, the availability of public disclosure data on community *Access* to clean water and sanitation can help them gain a renewed awareness of the impact of their water use on other water users in order to more effectively ameliorate conflicts with other water use groups. Improving corporate reporting on *Access* to clean water and sanitation can also help to strengthen the spatial resolution of government monitoring systems, creating a more detailed evidence base to assess the effectiveness of policy interventions to safeguard access of vulnerable groups to clean water and sanitation at the local scale.

Moreover, improving the level of publically accessible information on water sustainability can improve accountability of all actors within India's water economy. Indeed, inroads into reducing water pollution in India have historically stemmed from public interest litigation (PIL) cases filed by civil society organisations in court[17].

Decisive action on reconciling blind spots within, and misalignments between, corporate and government reporting on *Access* to clean water and sanitation will improve India's readiness to enacting several water *Access*-related goals within the SDGs[I] and its own national water objectives (Appendix C) in tandem.

Equally, the level of *Compliance* reporting between corporate and government frameworks analysed indicates a poor preparedness of India to enact the water-

[I] Goals 3.3; 3.9; 6.1; 6.2
(See Appendix A for full descriptions of SDGs)

related SDGs. Unexpectedly, we find a gradient between corporate and government reporting on reporting *Compliance*. At the corporate level, *Compliance* was represented by indicators and guidelines within one of the three corporate water reporting framework analysed - The CEO Water Mandate, which is an external public-private initiative designed to assist companies in the development, implementation and disclosure of water sustainability policies and practices[18]. Meanwhile, despite examining two state initiated frameworks for environmental and social governance reporting - the SEBI's Business Responsibility Reports[19] and the National Voluntary Guidelines[20] - we observe no monitoring or reporting of *Compliance* with water-related legislation. Within this context there is therefore no onus on businesses to comply with water legislation, and instead overwhelming opportunity to overexploit water resources owing to information asymmetries between monitoring scales[21].

Consequently, the absence of consistent monitoring and reporting *Compliance* with local, national and international water legislation between corporate and government levels creates a significant barrier to enacting India's National and Rural Water Sustainability Objectives (Appendix C) as well as contributing towards several supranational water-related SDGs[II].

Elsewhere, we observe a further blind spot in corporate and government water sustainability reporting on the availability of *Infrastructure* to deliver clean water efficiently and sustainably to different water user groups. The urgency of channelling more resources towards monitoring and reporting water *Infrastructure* capacity is heightened by its cross-cutting relevance to the broader SDGs framework (around hunger, health, sanitation, energy and resilience infrastructure).

A holistic approach to measuring the quality of water *Infrastructure* across spatial scales and between levels of governance will also help India to develop its water infrastructure in line with national[22] and rural[23] water objectives linked to widening access to clean water and sanitation.

Furthermore, demand on water *Infrastructure* in India is set to increase, driven chiefly by rising domestic demand for rice, wheat and sugar within India's rising population and shifting dietary trends towards middle-class diets[24]. The prospect of widening gaps between demand and supply within India's most populous water basins - the Ganga, the Krishna, and the Indian share of the Indus – by 2030

[II] Goals: 3.9; 6.2; 6.3; 6.4; 6.6; 12.4; 14.1
(See Appendix A for full descriptions of SDGs)

underpins the need for robust monitoring and reporting of the ability of India's water *Infrastructure* to effectively respond to future demand.

Lastly, our analysis of the state of corporate and government water reporting in India highlights a lack of temporal measurement of water sustainability in India's water economy. For India's governments, and businesses within its economy, the failure to measure temporal trends across different water sustainability indicators abstracts the progress India has made towards navigating a sustainable water future. In addition to broadening the coverage of corporate and government water reporting across the aforementioned aspects of water sustainability there is a clear need for time-series reporting of indicators to assess the level of decoupling between India's economic development and the sustainable utilisation of water within its economy, and in turn monitor progress against the water-related SDGs (Appendix A) and India's national and rural water objectives (Appendix C)

Broadening Corporate Reporting

The challenge of improving the state of corporate water reporting in India is two-fold. First, improving the coverage within, and alignment between corporate frameworks used to monitor and report water sustainability with national measurement frameworks and the water-related SDGs (addressed above and in section 4). Second, widening reporting within corporate frameworks to ensure greater transparency of impacts occurring within India's water economy. Within this report we characterise the latter challenge by analysing existing levels of corporate water reporting within the GRI guidelines across a range of industrial sectors in India (see section 5).

Overall, we find levels of corporate water reporting in India's top 200 businesses are relatively low – only 79 out of 200 businesses disclose environmental and social governance performance and one-in-four use the Global Reporting Initiative (GRI) guidelines to measure their sustainability performance.

We observe higher rates of corporate reporting against the GRI[III] water-related indicators within private sector businesses than in the state sector. This might infer a potential regulatory bias of state enterprises and different incentive structures for water reporting within the private- and public-sector settings. However, this finding requires further interrogation.

[III] A leading reporting system that enables businesses and organisations to monitor and report their sustainability across social, environmental and economic dimensions

Within those organisations reporting against the GRI guidelines, water reporting is by no means homogenous across industrial sectors. Instead, both the level and nature of water reporting vary across different sector types. Our analysis finds a dearth of water sustainability reporting within India's *Services* and *Utilities* sectors. The need to broaden water reporting within these sectors is heightened by forecasted increases in consumerism and water and energy usage within India's burgeoning middle class over the next 20 years[25]. Still, even in sectors where we observe the highest levels of water sustainability reporting (*Transport*, *Conglomerates* and *Raw Materials, Construction and Agriculture*) levels are still modest[IV] in comparison to their relative share of water resource use within India's economy.

These findings form a compelling case for mandatory water reporting to fully capture the relative impacts of different sectors within India's water economy[26,27,28] and the potential introduction of appropriate water shadow pricing and/or other measures to encourage sustainable use of water resources across industrial sectors. Clearly, policy interventions to widen corporate water reporting must be targeted by sector to overcome relative barriers to disclosure of performance.

'Best-worst' analysis of corporate water reporting indicates an immediate need for more detailed reporting on ecosystem and biodiversity impacts of water use and water sources significantly affected by extraction. Here, there is an opportunity for businesses to harness government data on environmental stressors on ecosystems and water resources to help contextualise their impact. Encouragingly, a recent survey of Indian businesses found 94% of companies are actively collaborating with government departments to deliver CSR activities[29], suggesting a good foundation for information cascade between businesses and governments to help improve water sustainability reporting at both levels.

Finally, an important challenge to monitoring water sustainability across industrial sectors is the existence of India's informal economy, which is estimated to account for 50% of total economic output and an even higher share in water-intensive sectors such as agriculture, retail, hotels and restaurants, and construction[30,31]. However, at the present rate of formalisation it might take half a century before India's economy is fully formalised[32]. Rapid action to formalise water-intensive sectors in India is critical to widening corporate water reporting and improving the transparency of impacts occurring within India's water economy.

[IV] Levels of full-disclosure against GRI water-related indicators: Transport = 68%, Conglomerates 57%, Raw Materials, Construction and Agriculture = 50%

1. INTRODUCTION

Whilst, in almost all countries, the ownership of water falls under the dominion of national governments[33], globalisation of trade[34], uneven distribution of freshwater[35], privatisation of water infrastructure and resources[36], and the often trans-boundary nature of rivers and lake basins[37] creates a complex system of global water governance[38]. To fully capture the complexity of cross-scale and cross-level interactions[39] with the water system, and to detect and resolve risks effectively, water accounting requires coordinated monitoring and reporting of impacts within the water economy from the perspective of multiple stakeholders[40,41,42] - business, government and multi-lateral organisations.

This report examines the current state of corporate and government water sustainability reporting **in India**. We adopt two lines of inquiry. First, we examine coverage of, and alignment between, frameworks used to monitor and report on India's water sustainability. Second, we assess current levels of corporate water reporting across major industrial sectors.

We discuss the findings of these investigations and highlight opportunities for:

1) Improving coverage of, and alignment between, corporate and government water reporting in India, toward those suitable for measuring progress against water-related[v] UN Sustainable Development Goals (SDGs)[43].

2) Overcoming barriers to corporate level water reporting in India.

2. INDIA'S WATER ECONOMY

Over the past 150 years, India has invested in significant infrastructural improvements, particularly following its independence in the 1950s[44]. One major area of expansion has been water infrastructure, where improvements in water resource management have transformed previously arid areas into regional economic centres of growth and prosperity[45].

However, more recently, attempts to augment India's water supply have been challenged by mounting demand-side (population[46,47] overconsumption[48], dietary change[49] and industrial competition[50,51]) and supply-side (climate change[52,53], water pollution[54,55] and virtual water exports[56]) pressures which threaten the continued success of India's development, both economically and socially.

[v] See Appendix A for water-related SDGs

Despite issues related to water attaining high status within India's policy agenda, the lack of integration across different government ministries involved in water management has resulted in a fragmented approach[57,58,59] to water governance and a failure to respond to the threats facing different users groups within its water economy[60,61,62]. The growing incidence and severity of water conflicts[63,64,65] between different users exemplifies this.

One possible factor behind India's fragmented water governance is the existence of information asymmetries in water monitoring and reporting between different scales of water governance which could potentially encourage 'mission drift' between the priorities of different water user stakeholders (business, government and multi-national organisations) and subsequent derailment of progress towards national and supranational goals[66,67,68].

However, to date, there has been no formal evaluation of the magnitude of coverage within, and misalignment between water accounting systems employed across different governance levels in India, making it difficult to attribute this phenomenon to India's fragmented water governance regime.

An analysis of the state of corporate and government water reporting in India offers opportunities to mobilise stakeholders within the nation to help navigate national water objectives and water-related SDGs and in turn realise a more equitable and sustainable water future.

3. THE MEASUREMENT LANDSCAPE

India's mounting water crisis has reinforced the need to monitor its water sustainability. To this end, several different frameworks and tools have been developed for managing, monitoring and reporting water sustainability across corporate and government levels.

3.1 Coverage of water sustainability

In order to identify blind-spots within, and misalignments between, different levels of water governance we analyse several existing frameworks used to monitor and report water sustainability in India at corporate[VI] and government[VII] levels. This analysis is complemented by a comparison of corporate- and government-level water monitoring, and proposed targets within the water-related SDGs.

[VI] **Corporate Frameworks**: Global Reporting Initiative G4; CDP Water Disclosure Framework; The UN Global Compact CEO Water Mandate

[VII] **Government Frameworks**: Ministry of Statistics and Programme Implementation (Statistical Year Book); Ministry of Environment, Forests and Climate Change; National Voluntary Guidelines; SEBI Business Responsibility Reports.

We assess the coverage of frameworks across twelve dimensions of water sustainability[VIII] (See Appendix B for definitions):

- *Water Consumption*
- *Withdrawal/use*
- *Recycling*
- *Sustainable & contextual use*
- *Access*
- *Infrastructure*
- *State of water environment*
- *Impacts*
- *Compliance*
- *Costs*
- *Risk*
- *Impact on Entity*.

We attribute a score between 0 and 3 (where 3 is the best score)[IX] to indicate the detail of reporting and coverage of frameworks across each of the twelve dimensions. Based on this methodology we find a clear misalignment in the measurement of different aspects of water sustainability (*Figure 1*), owing to a diverse conceptualisation and consideration of water sustainability between business and government.

We also identify a lack of monitoring and reporting of annual trends in water sustainability. Overall we observe no time-series reporting criteria or indicators present within one out the three corporate frameworks[X] and four out of the five government frameworks[XI]. Notably, at the corporate level the CDP Water Disclosure framework required time-series reporting of *Compliance* with water regulation and *Impact on entity* (i.e. Identification of risks, opportunities, profitability impacts, reputational impacts on an entity in relation to action or inaction on water-related sustainability) and the CEO Water Disclosure Mandate encouraged time-series reporting across *Impact on entity*, water-related *Risk* and *Sustainable/contextual use* dimensions of water sustainability. At the government level we observe temporal water accounting within the Ministry of Environment, Forests and Climate Change across *Withdrawal/use* and *Sustainable/contextual use o*f water.

[VIII] See Appendix B for definition of water sustainability dimensions

[IX] Levels of coverage of frameworks were ranked from 0 to 3 to denote the quality of coverage and treatment of different dimensions of water sustainability. **0**=no coverage of the water sustainability dimension, **1**=requiring only yes/no, or qualitative information but with little detail of the water sustainability dimension, **2**=provides some quantitative information but with low detail of the water sustainability dimension, **3**= provides detailed metrics alongside qualitative explanations to a high level of detail which encompasses the water sustainability dimension in its entirety.

[X] GRI 4

[XI] The Ministry of Statistics and Programme Implementation, National Voluntary Guidelines and SEBI Business Responsibility Reports.

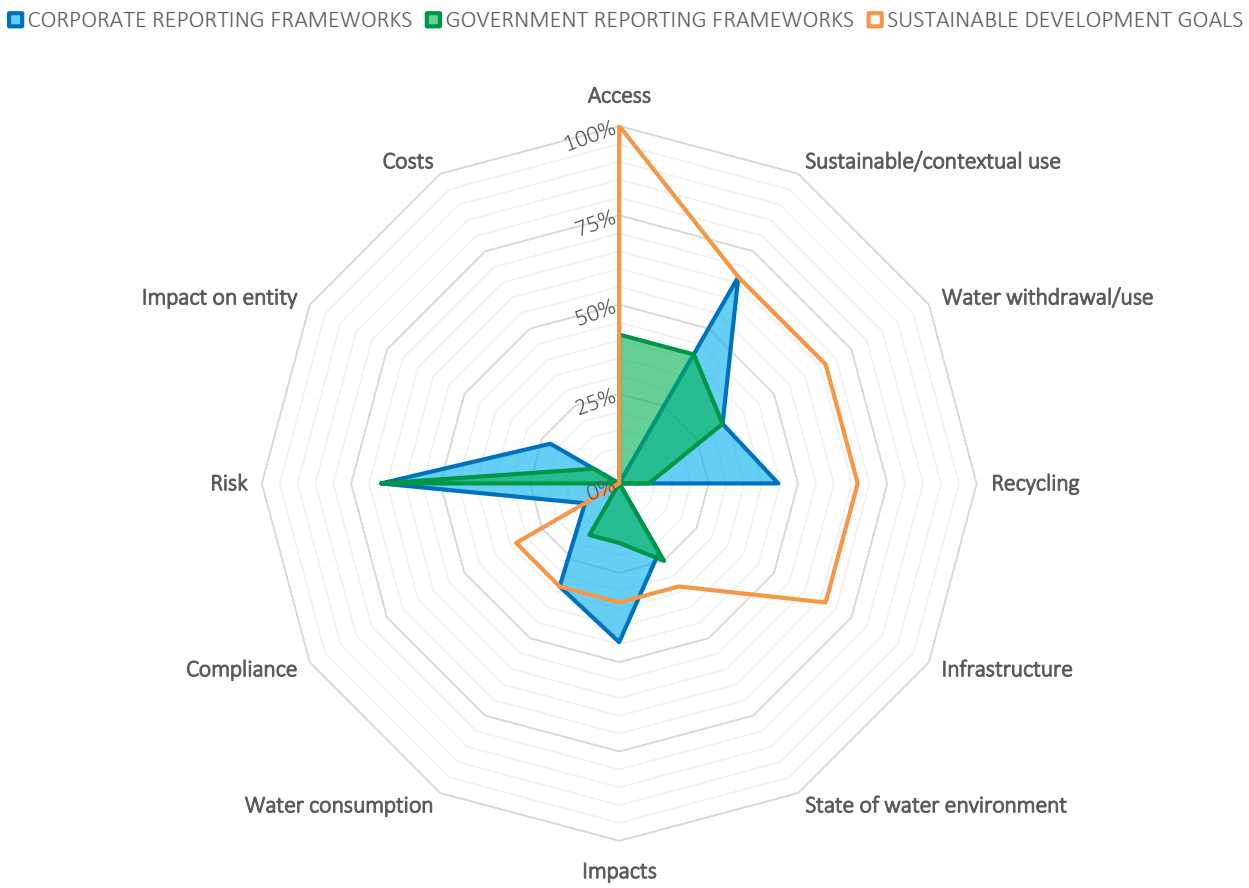

***Figure 1**: Levels of coverage of water sustainability dimensions within corporate and government reporting frameworks and within the water-related SDGs. Percentile levels of coverage derived from converting coverage scoring (0-3) for each framework within a reporting scale (corporate, government, SDGs) to fractions and corresponding percentages (0=0%, 1/3 = 33.3̇%, 2/3 = 66.6̇%, 3/3 = 100%), then averaging these across the number of frameworks analysed within a reporting scale to obtain an overall level of coverage at different levels across all water sustainability dimensions.* See Appendix D for worked example.

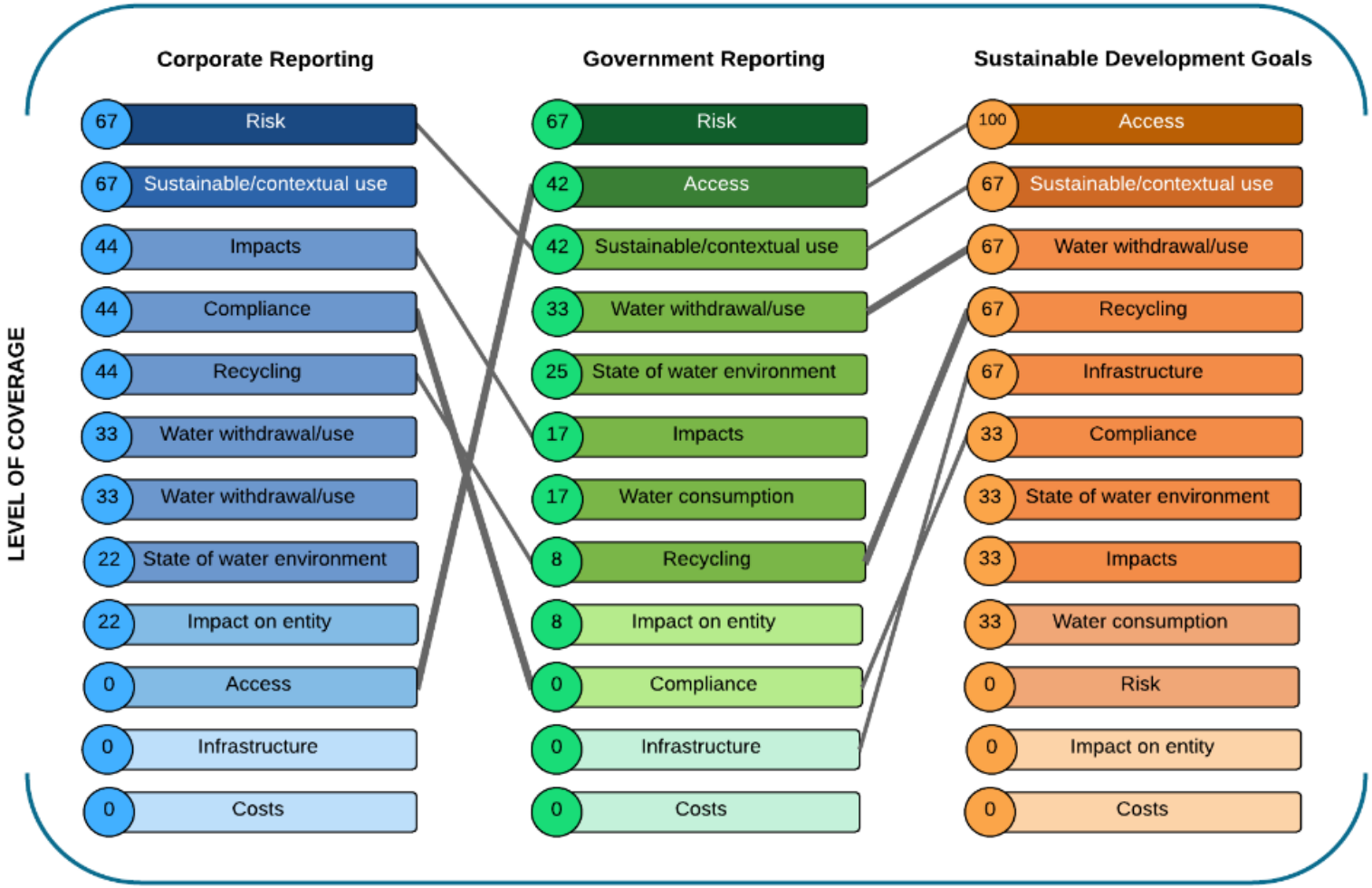

***Figure 2**: Levels of coverage and alignment between corporate and government frameworks used to monitor and report water sustainability in India and their alignment with the SDGs across different dimensions of water sustainability. Percentile levels of coverage derived from converting coverage scoring* (0-3) *for each framework within a reporting scale (corporate, government, SDGs) to fractions and corresponding percentages* (0=0%, 1/3 = 33.3˙%, 2/3 = 66.6˙%, 3/3 = 100%)*, then averaging these across the number of frameworks analysed within a reporting scale to derive an overall level of coverage of a particular water sustainability dimension at that level. See Appendix D for worked example. Lines linking governance levels represent significant misalignments between monitoring and reporting of a dimension. Thickness of lines indicates significance of misalignment between reporting scales. Thin lines reflect moderate misalignments between measurement levels* (20% ≤ difference in coverage of water sustainability dimension between reporting scales ≤ 40%); *thick lines reflect acute misalignments between measurement levels* (difference in coverage of water sustainability dimension between reporting scales > 40%+).

3.1.1 Corporate frameworks

Monitoring and reporting criteria within corporate frameworks tends to focus on a company's exposure to water-related business *Risks* (67%) as well as the *Impacts* of non-consumptive water use within water catchments, such as pollution, effluents and wastewater treatment (44%). Encouragingly we find relatively broad coverage (67%) of monitoring and reporting criteria around sustainable/contextual use of water, referring to business' utilisation of water resources and their relative impact vis-à-vis sector-wide sustainability, global water trends and water use in water-stressed/high-risk basins.

Nevertheless, we find no evidence across corporate monitoring and reporting frameworks that require companies to assess the impacts of their water use in relation to *Access* to water and sanitation and existing property rights regimes within the water basins in which they operate. Such omissions within corporate water reporting guidelines may potentially encourage poorer recognition of community-based water rights within businesses' water management practices.

Further blind spots in corporate water reporting include water *Infrastructure* reporting (0%), which relates to a company's impact on the state of water infrastructure used to supply clean water sustainably and efficiently to other water users, and *Costs* (0%), which relates to any payments for water contracts, water use permits and provision of sanitation.

Conversely, reporting *Compliance* with national and international regulation was covered in moderate detail across corporate reporting frameworks (44%) offering opportunities for understanding the efficacy of policy tools and interventions within India's water economy.

We find less detailed coverage of operational water sustainability, i.e. *Water withdrawal and use* (33%), *Water consumption* (33%) and criteria surrounding the effects of wastewater effluents on the *State of water environment* (22%). Despite water use efficiency information being comparatively easy to collect and with a cost implication in terms of efficiency and compliance we find no reporting criteria relating to trends in water use efficiency, preventing an assessment of the relative decoupling of output from water use over time within a business and across an industrial sector.

In summary, despite blind spots in coverage around water sustainability issues (*Access* to water, *Infrastructure* impacts, *Costs* of water permits and sanitation provision) there are encouraging signs in the development of nascent frameworks, and impact appraisal tools. The UN Global Compact CEO Water Mandate[69], a public-private initiative designed to assist companies in the

development, implementation and disclosure of water sustainability policies and practices has the potential to broaden reporting on issues related to *Compliance* with water legislation, *Sustainable/contextual* use of water in water-stressed or water-scarce areas and water-related business risks. Meanwhile, the WBCSD India Water Tool[70,71] is helping businesses better understand their exposure to water-related risk. In addition, the IIED's WAVES (Wealth Accounting and the Valuation of Ecosystem Services) tool[XII] promotes greater cognition of the impacts of a company's water use on ecosystem services and biodiversity[72].

3.1.2 Government frameworks

The importance of measuring water sustainability from a civil society and ecosystem perspective is reflected by the broad monitoring of *Risk* exposure of communities, ecosystems and biodiversity from pollution (67%), detailed monitoring of levels of *Access* to clean water and sanitation across districts (42%) and *Sustainable/contextual use* of water resources reflected by monitoring stressors to biodiversity and communities across water basins (42%), by India's government.

Unexpectedly, we identify no formal mechanisms and reporting frameworks which monitor *Compliance* with local, national and global water laws and regulations.

Aspects of water *Recycling* (8%), *Costs* (0%) related to water pricing and sanitation provision and the availability of *Infrastructure* (0%) to provide water safely and sustainably received little or no coverage as monitoring and reporting indicators across government ministries.

We observe acute misalignments between corporate and government reporting of water sustainability across aspects of *Access* to water (Corporate = 0%; Government = 44%) and *Compliance* with local, national and multi-lateral water laws and regulation (Corporate = 44%, Government = 0%) (*Figure 2*). These reporting asymmetries offer an opportunity for Indian businesses to contextual their impact on *Access* to water using government data on local and regional access and clean water and sanitation. Similarly, corporate reporting of levels of compliance with local, national and multi-lateral water regulation (44%) offers an opportunity for government monitoring of business compliance and barriers to compliance within India's water economy.

[XII] Wealth Accounting and the Valuation of Ecosystem Services (WAVES) is a global partnership that aims to promote sustainable development by ensuring greater cognition of natural resources within development planning and national accounting.

3.1.3 Water-related SDGs

The SDGs contain several targets related to access to water, recycling, sustainable use of water with respect to ecosystem and local context, water efficiency and improving infrastructure for delivering clean water safely and sustainably within nations (see Appendix A).

We observe several asymmetries between government level monitoring and reporting of water sustainability and the coverage of water sustainability within the SDGs, most significantly across *Risk* assessment (Government = 67%; SDGs = 0%), *Access* to water and sanitation (Government = 42%; SDGs = 100%), levels of water *Recycling* (Government = 8%; SDGs = 67%), and availability of *Infrastructure* to provide clean water efficiently and sustainably (Government = 0%; SDGs = 67%). We also find acute misalignments in the coverage between corporate water reporting and the SDGs, across *Access* to clean water and sanitation (Corporate = 0%; SDGs = 100%), availability of *Infrastructure* to provide clean water efficiently and sustainably (Corporate = 0%; SDGs = 67%) and levels of *Water withdrawal/use* within water sheds (Corporate = 33%; SDGs = 67%).

The lack of integration and congruence between monitoring and reporting of water sustainability in India between government, business and the SDGs suggests that government approaches to monitoring and managing water sustainability in India have largely been formulated in isolation to those at the corporate level. As a result, existing mechanisms for monitoring and reporting water sustainability between business and government in India are potentially ill-equipped for enacting and monitoring India's progress against the water-related SDGs. Moreover, such misalignment is at risk of creating a potential 'mission drift' between the objective, goals and actions of different water users within India's water economy. Indeed, a fragmented water accounting and management landscape may produce ineffective or undesirable interventions and policy decisions - e.g. granting *Access* to water resources and rights to one group at the expense of another, and pursuing the development of water *Infrastructure* at the expense of sustainable *Water withdrawal and use*. Ultimately, such misalignment could inspire actions and decision-making which derail progress towards the SDG development agenda.

'Existing mechanisms for monitoring and reporting water sustainability in India are potentially ill-equipped for enacting and monitoring India's progress against the water-related SDGs'.

3.2 Harmonising reporting and realising the SDGs

Misalignment presents a major barrier to coordinated management of water sustainability in India. The need to harmonise water reporting between across governance scales is heightened by India's national and rural water objectives (Appendix C) and the presence of several water sustainability targets within the SDGs (See Appendix A).

Our research reveals the nature and magnitude of misalignment between water sustainability reporting between corporate and government levels and in turn highlights opportunities for reconciling blind-spots and misalignments between reporting scales.

We assert an immediate need for more resources to be channelled towards monitoring and reporting *Costs* and availability of providing *Infrastructure* for clean water sustainably, and levels of *Compliance* with local, national and global legislation.

At the corporate level there appears a need for improved reporting of how industrial demand for water affects *Access* to water and sanitation and the *State of water environment* to ensure businesses reduce discharge in less resilient and ecologically sensitive areas.

However, more detailed government reporting against *Access* to water and sanitation (42%) presents an opportunity for broadening corporate reporting within this dimension using social data collected by government authorities. Contextualising corporate water reporting within local water-shed contexts will also help strengthen the spatial resolution of government water accounting, enabling effective monitoring of *Access*-related SDGs[XIII] at all scales and between all water user groups.

We also identify a need for monitoring and reporting of annual trends in water sustainability in order to understand the extent of decoupling between India's economic performance and growth and use of water across different spatial and governance scales.

4. CORPORATE WATER REPORTING IN INDIA

India has a long-standing commitment to protecting the natural environment; India was one of the first countries globally to establish a Ministry of Environment reflecting the high status of sustainable development on its policy agenda.

[XIII] Goals 3.3; 3.9; 6.1; 6.2
(See Appendix A for full descriptions of SDGs)

Since its inception in 1985 India's Ministry of Environment, Forests and Climate Change has implemented a series of mandatory regulations and non-mandatory guidelines to mainstreaming sustainable business practice within its economy to curb environmental pollution and degradation (*Figure 3*). Meanwhile, India's long-standing issues related to resource scarcity have encouraged Indian businesses to create products which use natural resources more innovatively and with greater efficiency[73,74], making them pioneers of 'frugal innovation'.

Furthermore, there is growing concern among India's business community at the threats posed by water-related risks. A survey conducted by Columbia Water Center on the perceptions of Indian businesses to water related risks found about 83% of businesses agreed that the availability of water was an existential risk to their bottom line. In terms of perception to long-term water risk 87% of businesses surveyed believed their business would become exposed to India's mounting water crisis within the next decade.

However, the treatment of sustainability issues within Indian businesses is likely to vary based on the materiality of issues within different sectors[75,76,77]. Levels of monitoring and reporting of environmental performance provides a good proxy[78,79] for the materiality of different sustainability issues across business sectors and their readiness for working towards environmental and social goals.

To date, there have been several studies[80,81,82] exploring corporate water reporting within Indian businesses; however, they have been unable to meaningful highlight the state of corporate water reporting across India's water economy, owing to several shortcomings. First, inquiries into the level of corporate reporting on water sustainability in India tend to be aggregated across sectors, preventing a meaningful understanding of the materiality of water sustainability across sectors in India. Second, sector-wide levels of corporate water reporting are invariably cited from samples of businesses operating within India's formal economy. However, around 50% of India's economy is estimated to be informal[83] - where we can reasonably assume a zero rate of water reporting disclosure - so existing studies tend to over-estimate the extent of water reporting and downplay the lack of transparency of water activity within India's water economy. Lastly, where inter-sectoral levels of monitoring and reporting of water sustainability are provided, they are often aggregated at the global level, preventing a meaningful understanding and comparison of the treatment of water issues by industrial sectors within India's economy.

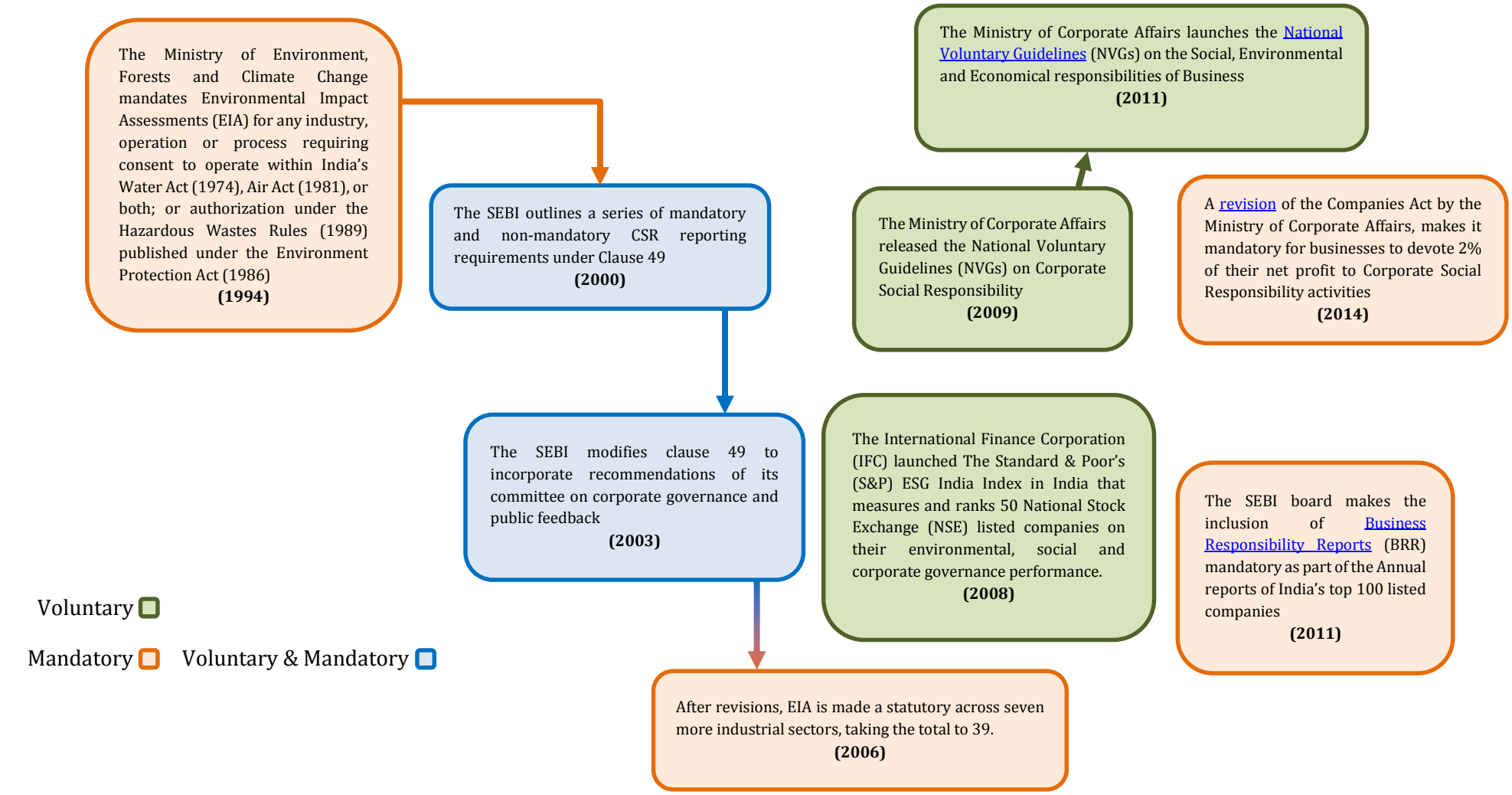

***Figure 3**: A timeline outlining significant policy and legislative measures surrounding corporate reporting on sustainability issues*

Consequently, there is a clear need for more detailed analysis of the materiality of water sustainability across different economic sectors in India.

We analyse aggregated data on environmental disclosures within Global Reporting Initiative (GRI) reporting guidelines. In total we analyse levels of corporate reporting from India's top 200 businesses[84] across five sectors – *Conglomerates* (10), *Raw Materials, Construction and Agriculture* (38), *Manufacturing* (62), *Transport* (22), *Utilities* (13) and *Services* (55) – against water-related GRI G4 indicators[XIV].

4.1 Levels of Water Reporting

Reporting within the top 200:

In total, 79 out of the 200 companies report their sustainability performance; the remaining 121 report their performance using solely financial reporting parameters. In addition, 50 out of the 79 businesses analysed opted to use GRI guidelines to disclose their sustainability performance. Within this sub-sample 64% report within GRI G3.1 guidelines, 30% within G3 and 6% within G4.

We find the highest rates of sustainability performance reporting within *Conglomerates* (50%) and *Transport* (45%) sectors and the lowest rate within *Manufacturing* (37%) businesses. Meanwhile, reporting within GRI guidelines was highest within *Conglomerates* (40%) and *Raw Materials, Construction and Agriculture* (34%) businesses and lowest within *Services* (16%).

The following section summarises our analysis of the 50 firms reporting within water related GRI guidelines. Levels of disclosure were measured based of a quality scale between 0 and 3[XV] compared across sectors using a corresponding percentile scale – see appendix E for working example. Use of the term 'full-disclosure' and 'non-disclosure' refers to reporting scores of 3 and 0 respectively.

Best-Worst Reporting:

The likelihood of businesses providing a 'Full-disclosure' against a GRI water sustainability indicator varied between indicators.

[XIV] GRI 4 water-related indicators. **Water withdrawal/use**: Total water withdrawal by source [EN8]. **Sustainable/contextual use**: Water sources significantly affected by withdrawal of water [EN9]. **Recycling**: Percentage and total volume of water recycled and reused [EN10]. **Impacts**: Total water discharge by quality and destination [EN22]; Identity, size, protected status and biodiversity value of water bodies and related habitats significantly affected by the organisation's discharges of water and runoff [EN26].

[XV] **0**= (Non-disclosure) no level of reporting, **1** = provides only yes/no, or qualitative information but or qualitative information but with little detail in relation to operations, **2** = provides some quantitative information but with low detail of the water sustainability dimension **3** = (Full-disclosure) provides detailed metrics alongside qualitative explanations to a high level of detail which encompasses the water sustainability dimension in its entirety.

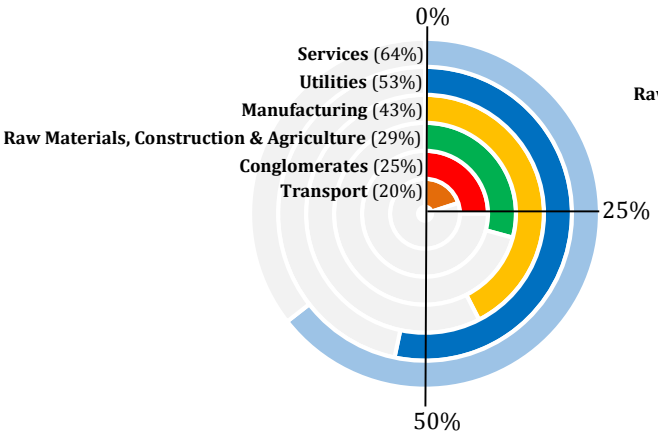

***Figure 3**: Proportion of 'Non-disclosure' across all water-related GRI indicators by sector within India's top 200 businesses*

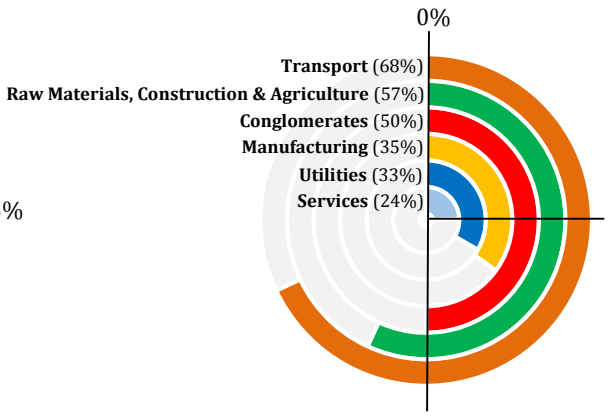

***Figure 4**: Proportion of 'Full-disclosure' across all water-related GRI indicators by sector within India's top 200 businesses*

At an aggregated level, businesses reporting within GRI were two times more likely to provide 'Full-disclosure' of '*Total water discharge by quality and destination*[EN22]' than they were reporting '*Identity, size, protected status and biodiversity value of water bodies and related habitats significantly affected by the organisation's discharge of water and runoff*[EN25]' or '*Water source significantly affected by withdrawal of water*[EN9]'. Over 70% of businesses reporting within GRI guidelines provided a 'Full-disclosure' disclosure of their '*Total water withdrawal by source*[EN8]', while over two-thirds of businesses failed to disclose any information on '*Water source significantly affected by withdrawal of water*[EN9]'.

State Vs Private

Notably, the rate of GRI reporting of businesses within the private sector was five times greater than businesses in the state sector, 21% and 4% respectively. In addition, private sector businesses exhibited higher levels of water reporting than state sector businesses across all four dimensions of water sustainability (Figure 6).

Inter-sectoral reporting

In terms of quality of reporting of businesses reporting within GRI guidelines, *Transport* businesses provided the lowest proportion of non-disclosures and the greatest proportion of full-disclosures against GRI indicators. In contrast, the *Services* sector businesses provided the lowest proportion of 'Full-disclosure' disclosures and the highest proportion of non-disclosures against GRI indicators (*Figure 4*; *Figure 5*).

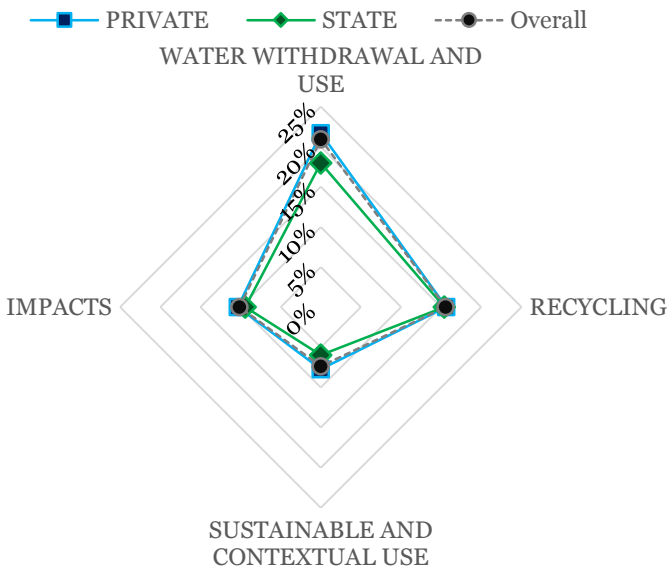

***Figure 6**: Levels of water reporting against different dimensions of water sustainability within private and state-owned companies*

This finding echoes similar studies within India which find levels of sustainability reporting among oil gas, extractives industries to be higher than in banking and finance sectors and other services sectors[85,86,87].

India's informal economy

The majority of studies examining corporate water reporting within India tend to draw conclusions about the state of corporate reporting across the entire economy based on a study of businesses operating within India's formal economy. Such extrapolation assumes similar levels of reporting within the sample as across the entire economy. However, in India, approximately 50% of economic output comes from the informal sector[88].

India's informal economy is also more endemic in water-intensive sectors such as agriculture, retail, hotels and restaurants and construction[89,90]. We can reasonably assume a zero-rate of non-financial corporate reporting of business operating within the informal sector.

Assessing levels of corporate water reporting in India must, for the purpose of accuracy, account for this large 'black-box' in disclosure to fully reflect the level of understanding we have of activities occurring within India's water economy.

4.2 Widening corporate reporting

Upon inspecting business sustainability reports and literature on water reporting across different industrial sectors we find several extant barriers to widening corporate reporting:

1. Water is not a material issue.
2. Reporting in certain areas of water sustainability is not mandatory[91].
3. Cost entailed in monitoring and reporting – particularly for SMEs.
4. CSR in India is still in an era of corporate philanthropy[92,93,94,XVI].
5. The presence of the informal economy within water-intensive sectors.
6. Lack of information to monitor and report impact within the water system.
7. Business tend to disclose performance qualitatively rather than quantitatively preventing industrial sector and time-series comparisons of sustainability[95,96,97].

In response we recommend several measures for overcoming these reporting barriers:

Mandatory reporting will stimulate wider reporting of impacts across sectors and should be considered in the short-term for water-intensive sectors[98,99,100]. One option could be to extend mandatory coverage of the Business Responsibility Reporting beyond India's top 100 businesses. Failure to mandate environmental disclosures from business sectors could lead to firms displaying opportunistic behaviour, exploiting information asymmetries among various stakeholders and in turn, generating greater environmental externalities[101].

Harnessing government data on the state of the water environment and the nature of vulnerability to biodiversity and local communities – which our research shows is well measured at the government level – to enable businesses to understand and contextualise the relative impact that their activities are having with a local watershed. This will not only help reduce the costs and widen the uptake of corporate water reporting but also generate sector-specific information on water sustainability across India's economy, creating a more robust evidence base for policy makers.

Formalising the informal economy represents perhaps the most significant step towards widening corporate water reporting since the informal economy is not controlled by the same restrictions as the formal economy, and hence does comply with regulations around corporate reporting and environmental laws[102]. However, at the present rate of formalisation it might take half a century before India's economy is fully formalised[103].

[XVI] A recent revision of the Companies Act by the Ministry of Corporate Affairs in 2014 to make it compulsory for businesses earmark 2% of their net profit to Corporate Social Responsibility 'activities' reflects how CSR in India is still manifested in forms of corporate philanthropy.

The process of formalising India's economy will be complex, not least because it accounts for more than 90 per cent of India's workforce and 50 per cent of its overall national product[104]. Moreover, measures towards this goal need to recognise and address the systemic barriers incumbents of the informal economy face in integrating into India's formal economy, i.e. bureaucracy involved in registration of informal enterprises and high costs to adhere to regulation[105]. Ultimately, measures to green the informal economy must be sensitive to the various burdens the formal economy imposes on already vulnerable actors to avoid shifting anti-green activities to the informal economy and promoting further exclusion of business within India's progress towards the SDGs[106].

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APPENDICES

Appendix A: Water-related Sustainable Development Goals

For complete goal list see: **UN**. (2014). *Open Working group Proposal for Sustainable Development Goals* [Online]. Available at: http://sustainabledevelopment.un.org/content/documents/1579SDGs%20Proposal.pdf [Accessed 21st November 2014].

2.4 by 2030 ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality

3.3 by 2030 end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combat hepatitis, water-borne diseases, and other communicable diseases

3.9 by 2030 substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination

6.1 by 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.2 by 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.3 by 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and increasing recycling and safe reuse by x% globally

6.4 by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity

6.5 by 2030 implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.6 by 2020 protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.6a by 2030, expand international cooperation and capacity-building support to developing countries in water and sanitation related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.6b support and strengthen the participation of local communities for improving water and sanitation management

11.5 by 2030 significantly reduce the number of deaths and the number of affected people and decrease by y% the economic losses relative to GDP caused by disasters, including water-related disasters, with the focus on protecting the poor and people in vulnerable situations

12.4 by 2020 achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed international frameworks and significantly reduce their release to air, water and soil to minimize their adverse impacts on human health and the environment

14.1 by 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution

Appendix B: Definitions of water sustainability dimensions

Dimensions of Water sustainability	Definition
Water Consumption	Consumptive use of water: Water that is extracted and used up, but not returned to the catchment)
Withdrawal/Use	Non-consumptive use: water that is extracted for a given purpose, but then returned to the catchment
Recycling	Water within a facility that is re-used within a process to prevent additional extraction from catchment
Sustainable /Contextual Use	The relative *impact* that water use/consumption has on the catchment within the context of a surrounding population (ecological and social), i.e. Does it cause water scarcity?; how does it compare with total water availability; are ecosystems and biodiversity sensitive to water discharge?
Access	Measures of access to (clean) water and sanitation by local communities
Infra-structure	Availability of infrastructure to provide (clean) water (efficiently/sustainably)
State of water environment	Metrics related to catchment quality and other wider environmental variables
Impacts	Metrics which relate to non-consumption-based impacts on water catchments (e.g. Pollution/wastewater)
Compliance	Measures of compliance with local/national/regional/international legislation
Costs	Costs related to investment in infrastructure, i.e. payments for water contracts and sanitation provision
Risk	Presence of risk-assessment type activities conducted in relation to water/water use
Impact on entity	Identification of risks, opportunities, profitability impacts, reputational impacts on an entity in relation to action or inaction on water-related sustainability (e.g. To benefit business investors - but not exclusive to business if information on this is available at other scales)

Appendix C: National and Rural Water Sustainability Objectives in India.

National Objectives: **Ministry of Water Resources**. (2011). *National Water Mission under National Action Plan on Climate Change: Comprehensive Mission Document*. Vol 1. New Delhi, India: Government of India.

Rural Objectives: **Ministry of Drinking Water & Sanitation**. (2014). *Annual Report 2013-14*.

National Objectives	
1. Comprehensive water data base in public domain and assessment of the impact of climate change on water resource	
2. Promotion of citizen and state actions for water conservation, augmentation and preservation	
3. Focused attention on vulnerable areas including over-exploited areas	
4. Increasing water use efficiency by 20% (by 2017)	
5. Promotion of basin level integrated water resources management	
Rural Objectives	
BY 2017 ENSURE THAT…	At least 55% of rural households are provided with piped water supply
	At least 35% of rural households have piped water supply with a household connection; less than 20% use public taps and less than 45% use hand pumps or other safe and adequate private water sources.
	All services meet set standards in terms of quality and number of hours of supply every day.
	All households, schools and anganwadis in rural India have access to and use adequate quantity of safe drinking water.
	Provide enabling support and environment for Panchayat Raj Institutions and local communities to manage at least 60% of rural drinking water sources and systems.
BY 2022 ENSURE THAT…	At least 90% of rural households are provided with piped water supply
	At least 80% of rural households have piped water supply with a household connection; less than 10% use public taps and less than 10% use hand pumps or other safe and adequate private water sources.
	Provide enabling support and environment for all Panchayat Raj Institutions and local communities to manage 100% of rural drinking water sources and systems.

Appendix D: Method of deriving percentile levels of coverage from monitor and reporting framework analysis

Corporate Framework	Step 1 Score of coverage against Compliance (/3)*	Step 2 Score as a fraction	Step 3 Percentile score	Step 4 Coverage of corporate frameworks across Compliance
GRI 4	0	0/3	0%	Level of coverage at corporate level on compliance = sum of percentile scores/n frameworks analysed **Level of coverage**$_{compliance}$= $\frac{0\%+33.\dot{3}\%+100\%}{3}$ =42%
CDP	1	1/3	33.3%	
CEO Water Mandate	3	1	100%	

Notes

*__0__= no coverage of water sustainability dimension within framework, **1** = basic coverage of water sustainability dimension within framework using qualitative and/or highly aggregated quantitative indicators, **2** = Detailed coverage of water sustainability dimension within framework using qualitative and quantitative metrics to contextualise monitoring and reporting between spatial scales **3** = holistic coverage of sustainability dimension within framework using detailed metrics alongside qualitative explanations to a contextualise monitoring and reporting between spatial scales and relevance to multiple water user groups

Appendix E: Method of deriving percentile levels of sector-wide corporate water reporting

Industrial Sector	Business	Step 1 Score of coverage against *Access* (/3)*	Step 2 Score as a fraction	Step 3 Percentile score	Step 4 Level of sector reporting against *Access*
Services	Firm 1	2	2/3	66.$\dot{6}$%	Level of sector reporting = sum of percentile scores/n firms analysed **Level of reporting**$_{Access}$= $\frac{66.\dot{6}\%+33.\dot{3}\%+100\%}{3}$ =67%
	Firm 2	1	1/3	33.$\dot{3}$%	
	Firm 3	3	1	100%	

Notes

***0**= (Non-disclosure) no level of reporting, **1** = provides only yes/no, or qualitative information but or qualitative information but with little detail in relation to operations, **2** = provides some quantitative information but with low detail of the water sustainability dimension **3** = (Full-disclosure) provides detailed metrics alongside qualitative explanations to a high level of detail which encompasses the water sustainability dimension in its entirety.